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Henri A. Wassenbergh*

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 L. OUTER SPACE 50-55 (1989); C.B. Christensen and R. G. Steen, *Regulation of Commercial Space Transportation*, unpublished paper presented at the 35th IISL Colloquium, Washington D.C., USA, August-Sept. 1992.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

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* 247ff. (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 1944⁶), 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

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

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

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.P.H. 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 Flight*, *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* stop¹⁶ 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.

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

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 transportation 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 flight²⁰ and (b) for transportation purposes, as the movement of payloads between areas under different jurisdictions.²¹

IV. Special Launching and Space Transportation Law²²

Next to the existing regime in air law of the 'traffic rules' of the air²³ 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

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 be 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 vehicle²⁷ 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

²⁵ Cf. also I.H.P.H. 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;

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 Law³²

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

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

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

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. Kuskovelis, *The Space Risk and Commercial Space Insurance*, 9 SPACE POL'Y 109ff (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

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

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 activities, 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 existence 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 prerequisites; 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 identified 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 capabilities 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

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.

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 geostationary 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.

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.

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 Iridium 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'^{5.8}

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.^{5.9}

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).

^{5.8} 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.

^{5.9} 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-boostered 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.)

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 - Developments 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 325ff. (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

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.

SOME STRATEGIC DEFENSE INITIATIVES TOWARD PREVENTING U.S. SPACE INSURANCE RELATED DISPUTES AND LITIGATION

Stephen Tucker¹

Introduction

All would agree, it is in no one's best interest to become embroiled in protracted and complex space insurance related litigation/disputes venued in the United States. With that in mind, this paper is intended to explore, from a legal standpoint, some specific problem areas which tend to arise because of a lack of sufficient consideration of the following: (i) insuring agreements which contain language which it can be argued is subject to interpretation, (ii) requirements associated with proving a loss, (iii) due diligence requirements of the insured, and (iv) the insured's duty to advise of material changes to a risk. Reference will be made to some pertinent U.S. based space litigation involving the Westar IV and V satellites and the Leasat 3 satellite to illustrate how legal principles interplay with the problem areas, in the judicial environment. Finally, some recommendations, which will be called "strategic defense initiatives", will be made in the hope that parties to future space contracts can avoid some of the hazards which have led to disputes and litigation in the past.

The Recurring Problem Areas

The majority of space related insurance disputes between insurers and their policy holders, seem to have arisen because of:

1. Insuring Agreements which contain language which is subject to interpretation, and/or
2. requirements associated with proving a loss, and/or
3. due diligence requirements of the insured, and/or
4. the insured's duty to advise of material changes to risks.

Wording of Insuring Agreements

Contract law in the United States generally provides that in order for a valid and binding contract of insurance, or for that matter any

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contract, to be formed, the following four requirements must be met: (i) competent parties, (ii) legal subject matter, (iii) consideration and (iv) mutual assent. And the wording of the Insuring Agreement in an insurance policy is key to determining whether there has been a mutual assent, which is also sometimes referred to as a "meeting of the minds".

In many past disputes involving Insuring Agreements, where there has been some question about whether there had indeed been a mutual assent of the parties, the controversies involved either:

- (a) Agreements with terms that were not sufficiently specific or were conditional in nature, or
- (b) Agreements containing ambiguous terms.

The following is an example of an Insuring Agreement which would fall into category (a):

"Underwriters will indemnify the assured if the power output on the transponders fails to meet a level to be later agreed".

Such a wording can be characterized as an "agreement to agree" and would be generally unenforceable until such time as a "level" is agreed by the parties.

The following is an example of an Insuring Agreement (see (b) above) which contains a term that is so ambiguous that a court might be forced to "reform" the language to conform to the intent of the parties in order to find a valid contract:

"Underwriters will indemnify the assured if the power output on the transponders falls below a usable level"

The word "usable" is the main problem here. If this wording were to become the subject of litigation, one could rest assured that, depositions of the producing and placing brokers, and representatives of insurers and insured, would be necessary to attempt to find the true intent of the parties in the choice of the word "usable".

Requirements Associated With Proving A Loss

There is generally a condition contained in space insurance policies that requires that in the event of a loss, as soon thereafter as is practicable, a Proof of Loss must be filed in such form and including such information as Underwriters may reasonably require and request. In these policies, there is also usually a requirement that after the insured files a Proof of Loss, a certain amount of time will then be available for insurers to investigate the claimed loss. Under U.S. law, there is also an implied condition in all, including so-called "all risk", insurance policies that a

fortuitous event occur in order for a loss to be covered. After all, insurance is a game of chance, not a guarantee.

In the respected legal treatise *Couch on Insurance*, the following language appears:

The purpose of a provision for proof of loss is to afford the insurer an adequate opportunity for investigation, to prevent fraud and imposition upon it, and to enable it to form an intelligent estimate of its rights and liabilities before it is obligated to pay. Its object is to furnish the insurer with the particulars of the loss and all data necessary to determine its liability and the amount thereof.

The purpose is also to advise the insurer of facts surrounding the loss for which claim is being made. The proof of loss is also used by the insurer to make an estimate as to whether and under what factual circumstances recovery under the policy would be warranted.²

From past experience, space insurers generally require, at a minimum, the following be contained in a Proof of Loss:

1. A general statement identifying the policy under which the claim is being made and further identifying the property insured, the coverage provided, and the identity of the claimant and the insurer;
2. A description of the claimed loss including the time of the loss, a statement concerning the probable cause of the claimed loss and the result of the claimed loss. A statement ruling out excluded causes under the policy is sometimes required;
3. A statement concerning when notice of loss was first given to insurers;
4. A statement concerning ownership of the insured property upon which a claim is being made;
5. A statement concerning other insurance on the property;
6. A statement concerning the amount claimed and about the actual amount of the loss;
7. A statement concerning subrogation rights;
8. A statement affirming the assured played no part in intentionally causing the loss;
9. A statement concerning the assured's cooperation in Underwriter access to information;
10. A statement concerning non-waiver of insurer rights; and
11. that the Proof be sworn and subscribed by a corporate officer.

The requirement in item 2 above, tends to make a generic Proof of Loss form practically impossible to compose. The reason for this difficulty is that a generic form would have to take account of the almost infinite variety of underlying scenarios for every possible type of loss (e.g.: power related, fuel related, transponder related, housekeeping system related, etc.).

Space related policies are often described as all risk in nature. The term "all risk" is actually a misnomer, because all risk policies are not "all loss" policies.³ All risk policies have an implied exclusion that a loss must occur as a result of a fortuitous event. The requirement of a fortuitous event is a "fundamental principle of law in interpreting insurance contracts."⁴ If the courts were to allow recovery under insurance policies without the fortuity requirement, public policy would be violated and fraud would be encouraged. Simply stated, an insurance policy is not a warranty of soundness.

Damage associated with a loss has generally been found by the U.S. courts to be fortuitous if neither party knew or contemplated that there was any defect at the time of the issuance of the insurance contract. A fortuitous event is one which so far as both parties to the contract are aware, is dependent on chance.

Due Diligence Requirements

The most well known case dealing with the subject of due diligence, as applied to a satellite insurance policy, is *Hughes Aircraft Company v. Lexington Insurance Company*⁵, which was filed by Hughes in 1986 in Los Angeles California Superior Court. The ultimate result in the case reflects what a strong duty can be imposed on an insured to avoid or diminish a loss.

By way of background, after reciting certain facts relating to the insurance policy and other contracts underlying the dispute, Hughes' Second Amended Complaint For Breach of Insurance Contract, Breach of Covenant of Good Faith and Fair Dealing, Breach of Statutory Duties and Breach of Fiduciary Duty against Lexington alleged, in pertinent part:

11. The [underlying] Contract required the Satellite to be at a synchronous altitude of approximately 22,000 miles. The Satellite as of the date of filing of this action was in a useless and deteriorating orbit of approximately 160 miles and was

³ Standard Structural Steel v. Bethlehem Steel Corp., 597 F. Supp 164, 192, (D. Conn. 1984).

⁴ Compagnie Des Bauxites De Guinee v. Insurance Company of North America, 554 F. Supp. 1080, 1083 (W.D. Pa. 1983), *rev'd on other grounds*, 724 F.2d 369 (3rd Cir. 1983).

⁵ Hughes Aircraft Company; Hughes Communications Services, Inc. v. Lexington Ins. Co., No. C-560-805 (Ca. Super. Ct. L.A. County filed March 26, 1986).

not acceptable to the U.S. Navy. The Satellite has at all relevant times since April 13, 1985 been a "Total Loss" as defined by the Lexington Policy. No "reasonably practicable" measure (as defined in Section 5(a) of the Lexington Policy) existed which, within a reasonable time or any time, could enable the Satellite to achieve Successful Orbit. Indeed, the only possibility for attempting to salvage the Satellite was an untested and unprecedented salvage mission by another space shuttle, the cost of which was estimated to approach one-quarter of the total cost of the Satellite. The implementation of such a speculative salvage mission was not a "reasonably practicable" measure "to avoid or diminish any loss" as required by clause 5(a) of the Lexington Policy.

12. On or about April 20, 1985, plaintiffs gave due and timely notice of the Total Loss of the Satellite to Lexington. Plaintiffs also submitted a sworn statement and proof of loss claiming the full Lexington Policy proceeds of \$4 million (the "Claim"). Plaintiffs' notice and proof of loss complied in all respects with their notice and proof of loss obligations under the Lexington Policy.

13. On or about May 14, 1985, Lexington denied the Claim. Lexington has failed and refused and continues to fail and refuse to pay the \$4 million due to plaintiffs under the Lexington Policy.

14. As a direct and proximate result of Lexington's failure to pay benefits due under the Lexington policy, plaintiffs have been damaged in the amount of \$4 million, together with interest thereon."

Attached to the Second Amended Complaint was a copy of the insurance policy. Condition 5(a) of the policy reads:

"5. NAMED INSURED'S DUTIES

In the event of an occurrence likely to result in claim, the Named Insured shall:

(a) Use due diligence and do and concur in doing all things reasonably practicable to avoid or diminish any loss under this policy."

After the satellite had been marooned in low orbit, Hughes did indeed enter negotiations with NASA to repair it. Thirteen of the fourteen insurers agreed to pay a total loss, with Lexington being the only hold out. After the discussions with NASA, Hughes proposed to insurers that if insurers would pay for the repair mission, and the mission were to turn out to be successful, the insurers could share in the subsequently earned revenues, potentially earning back most, if not all, of their loss payments.

Lexington only agreed to pay for its share of the repair mission, but not to make any loss payment, reasoning there had not been a total loss under the policy.

In August of 1990, after a six week trial, a jury decided that Leasat 3's initial failure to reach its intended orbit did not constitute a total loss under the policy. Therefore, judgment was entered in favor of Lexington. Hughes later appealed.

The Insured's Duty to Advise of Material Changes to Risks

A typical Material Changes condition in a contemporary space insurance policy might read:

If the Named Insured shall waive or modify any Technical Specifications [such term defined elsewhere in the policy], the Named Insured shall promptly notify Insurers of such waiver or modification. Insurers shall then have the right to review all of the terms and conditions of the Policy with the Named Insured and to the extent the waiver or modification results in an increase in risk of loss or change in insurable interest under the Policy, to renegotiate the effected terms. To the extent such negotiations cannot be successfully concluded, where a loss subsequently occurs and such loss is the direct result of said disputed waiver or modification; said loss or any loss resulting therefrom shall not be covered under the Policy.

Under the terms of the above wording, it is extremely important that the insurers receive up to date underwriting information all the way through and past the time of launch of the insured space device. A number of disputes have arisen because of failures to provide up to date information.

The Western Union Fuel Related Litigation

The following information is contained in public records concerning the case of *Western Union v. Lexington and the AA Mutual Defendants*, pending in the federal court for Newark, New Jersey.⁶ In that litigation the firm of Mendes & Mount, in which firm the author of this note is a partner, represents the so-called AA Mutual Defendants. The AA Mutual Defendants comprise the vast majority of insurers who are parties to the action.

Stripped to its essence, Western Union⁷ sued insurers for alleged breach of contract for failure to pay claims for some \$57,300,000 for

⁶ New Valley Corporation v. Lexington Insurance Company, No. 91-193 (D. N.J. filed Jan. 18, 1991).

⁷ Western Union is now known as New Valley Corporation.

Insufficient Fuel associated with the Westar IV and V satellites. The claims rely on language in the life insurance section of the policy which reads, in pertinent part: "Underwriters will pay for loss of hydrazine occurring after the expiration of this policy that results from causes known to exist during the policy period." The suit has been prosecuted by Western Union despite their, among other things, not owning the Westar IV and V satellites at the time of the alleged loss, not having advised insurers of the potential claims until some five years after the policies expired, and despite the fact that the satellites were retired from orbit with substantial amounts of fuel remaining onboard. The successor company to Western Union, New Valley, entered Chapter 11 Bankruptcy after the suit was commenced but New Valley, nonetheless, continued to press the litigation forward as a debtor-in-possession.

The insurance policy underlying the dispute had a period extending from October 1, 1981, to October 1, 1984. Coverage was provided under three Policy sections: SECTION I - TRANSIT AND GROUND PROPERTY INSURANCE, SECTION II - LAUNCH INSURANCE, AND SECTION III - LIFE INSURANCE.

Claims were made by Western Union under the life insurance section of the Policy. The pertinent policy language associated with the claims reads as follows:

2. *LIABILITY OF UNDERWRITERS*

Underwriters Will Pay:

C. In the event of Insufficient Fuel, the Agreed Value per pound of hydrazine stated by endorsement. Underwriters will pay for loss of hydrazine occurring after the expiration of this policy that results from causes known to exist during the policy period.

3. *ATTACHMENT AND TERMINATION OF INSURANCE*

The insurance provided under this Section III attaches at 12:01 A.M. Eastern Standard Time on the 120th day following each Launch Attempt and terminates at policy expiration.

7. *FUEL BUDGET*

The fuel budget established prior to Launch Attempt will be reviewed and revised if necessary to reflect the actual amount of hydrazine fuel on board at the attachment of coverage under this Section III on the 120th day following each Launch Attempt.

It should be noted that Westar IV was launched February 26, 1982, and Westar V was launched on June 6, 1982.

The Policy defined Successful Launch as follows:

That within 120 days after a Launch Attempt, the WESTAR Spacecraft is: (1) placed on station in synchronous circular equatorial orbit in the longitudinal position assigned by the FCC and (2) functions so as to meet or exceed all Spacecraft Performance Specifications and (3) is determined to be capable of performing its intended commercial operations for its 10 year design life.

If the launch was not Successful, the Policy required that Western Union make a claim, if at all, under Section II of the policy, the launch coverage. With respect to fuel claims, the launch section provided for fuel values of about one-tenth of those computed under the life section of the policy, per pound of fuel.

Insufficient Fuel was defined in the Policy as follows:

"That the WESTAR Spacecraft's Reaction Control Subsystem has less than the budgeted amount of hydrazine fuel remaining at the end of indicated time period as stated by endorsement."

Endorsement Number Three to the Policy provides:

"For all purposes of this Policy, the Agreed Value per pound of Hydrazine under Section III of the Insuring Agreements is \$3,000,000."

The AA Mutual Defendants responded to Western Union's Complaint by asserting, among other things, the following affirmative defenses:

1. Failure to state a claim against which relief can be granted.
2. Plaintiff has failed to perform duties and meet conditions required under the Policy. [The conditions are set forth elsewhere in the Answer and include such things as failure to provide: timely and adequate notice of loss, adequate Proofs of Loss, reasonably obtainable information concerning the alleged losses, appropriate fuel budgets, and an accurate determination as to the successfulness of the launches.]
3. Waiver.
4. Laches.
5. Statutes of Limitations.
6. Estoppel.
7. No liability since no fortuitous event occurred.
8. Failure to supply appropriate and accurate fuel budgets.
9. Lack of a sufficient insurable interest.

10. No recovery since no cause known during the Policy period.
11. No recovery since failure to supply timely notice of loss.
12. Cause, if any, during launch phase, not life phase.
13. Failure to mitigate damages.

The AA Mutual Defendants also filed a Counterclaim asserting six different cause of action seeking declarations of non-coverage, reformation of the insurance policy to reflect the true understanding of the parties, and return of no claims bonuses/premium reductions improperly paid. What follows is the full text of the Counterclaims to illustrate the level of complexity of the matter:

COUNTERCLAIMS

JURISDICTION

1. These Counterclaims are compulsory under F.R.C.P. 13(a) and jurisdiction is proper under 28 U.S.C. Section 1367(a) (Counterclaim).

NATURE OF COUNTERCLAIMS

2. These are Counterclaims for Breach of Contract, for Unjust Enrichment, for Declaratory Judgments and for Reformation.

PARTIES

3. Counterclaimants are the AA Mutual Defendants named in this Answer.

4. The Counterdefendant is New Valley Corporation ("NEW VALLEY").

ALLEGATIONS PERTINENT TO ALL CAUSES OF ACTION

5. In 1981, NEW VALLEY, which was, among other things, in the telecommunications business, planned to launch three communications satellites to be known as Westar IV, Westar V, and Westar VI and desired to obtain insurance for these satellites.

6. In order to obtain this insurance, NEW VALLEY engaged the services of Alexander & Alexander ("A&A"), an insurance broker which held itself out to be an expert in such matters, as its agent to negotiate with the AA Mutual Defendants and others on NEW VALLEY's behalf.

7. Jointly and/or individually, NEW VALLEY and A&A drafted, arranged and designed policies of insurance for the Westar IV, V and VI satellites ("Policies") which Policies

were then submitted by A&A and/or other brokers acting on NEW VALLEY's behalf to the AA Mutual Defendants and to other insurance companies and entities worldwide. The AA Mutual Defendants individually agreed to the terms of the Policies and individually agreed to insure various percentages of the total coverage in return for payment by NEW VALLEY of corresponding percentages of the total premium. The period of the Policies all ran from October 1, 1981 until October 1, 1984.

8. The Policies provided three types of insurance for the Westar IV, Westar V and Westar VI satellites, which types of insurance are named Transit and Ground Property Insurance; Launch Insurance; and Life Insurance. For each satellite the Launch Insurance commenced upon its Launch Attempt and ran for 120 days. Then the Life Insurance commenced and ran until the Policies expired on October 1, 1984.

9. The launch insurance premium for Westar IV was fixed. However, the premiums for Westar V and VI depended on whether the previous Westar launch or launches were successful as defined under the Policies.

10. Under the terms of the Policies, NEW VALLEY had a duty to accurately determine whether each Westar launch was successful and to represent and/or warrant its success to the AA Mutual Defendants within 120 days of each Westar Launch Attempt.

11. A Successful Launch meant that the satellite (1) was placed on station in synchronous circular equatorial orbit in the longitudinal position assigned by the FCC and, (2) functioned so as to meet or exceed all Spacecraft Performance Specifications and, (3) was determined to be capable of performing its intended commercial operations for its 10 year design life. The Spacecraft Performance Specifications meant the specifications contained in the relevant Westar contracts between NEW VALLEY and the satellite manufacturer.

12. For each Successful Launch, under the terms of the Policies, NEW VALLEY was to be paid a No Claims Bonus in the amount of 20% of the premium it had paid for the launch insurance on that particular satellite.

13. The life insurance covered, among other things, "Insufficient Fuel". Insufficient Fuel meant that the satellite's positioning system had less hydrazine fuel remaining at a given time than was budgeted by NEW VALLEY, as indicated in budgets endorsed to the insurance policies.

14. As a basis for determining Insufficient Fuel losses NEW VALLEY was obligated to accurately calculate the fuel budget for each satellite before launch and to accurately adjust that budget as of the 120th day after launch to reflect

the amount of fuel remaining at the start of the life insurance period. Both the pre-launch and adjusted fuel budgets for each satellite were to be attached to, and to become a part of the Policies as endorsements.

15. To induce the AA Mutual Defendants to enter into the Policies agreement, NEW VALLEY represented to them that the fuel budget for the life policy period was deterministic.

16. The AA Mutual Defendants relied on NEW VALLEY's representation that the fuel budget for the life policy period was deterministic in agreeing to the terms of the life insurance portion of the Policies, and in particular, the Insufficient Fuel coverage.

17. Westar IV was launched on or about February 25, 1982. Under the terms of the Policies, NEW VALLEY represented and/or warranted to the AA Mutual Defendants that this launch was successful; and the AA Mutual Defendants relied on said representations and/or warranties.

18. Westar V was launched on or about June 9, 1982. Under the terms of the Policies, NEW VALLEY represented and/or warranted to the AA Mutual Defendants that this launch was successful; and the AA Mutual Defendants relied on said representations and/or warranties.

19. NEW VALLEY paid launch premiums for Westars IV, V and VI in the approximate amounts of \$7,125,000, \$6,000,000 and \$5,062,500, respectively or such amounts as are proved at trial. The AA Mutual Defendants received proportionate shares of these premiums.

20. Had NEW VALLEY not represented and/or warranted that the launches of Westars IV and V were successful, it would have paid approximately \$9,375,000, or an amount to be proved at trial, for each of the launches of Westar V and VI. The total additional premium would have been approximately \$7,687,500, or an amount to be proved at trial, of which the AA Mutual Defendants would have received their proportionate shares.

21. Having represented and/or warranted that the launches of Westars IV and V were successful, under the terms of the Policies, NEW VALLEY was paid and accepted No Claims Bonuses for approximately \$1,425,000, or an amount to be proved at trial, for Westar IV, and approximately \$1,200,000, or an amount to be proved at trial, for Westar V, respectively, for a total of approximately \$2,625,000, or an amount to be proved at trial, of which AA Mutual Defendants paid their proportionate shares.

22. On or about October 24, 1989, NEW VALLEY gave notice to A&A of a potential Insufficient Fuel claim with respect to Westar IV.

23. On or about November 7, 1989, NEW VALLEY gave notice to A&A of a potential Insufficient Fuel claim with respect to Westar V.

24. NEW VALLEY alleges that Insufficient Fuel resulted from plume impingement and/or thruster modeling errors. "Plume impingement" allegedly occurs when the exhaust from the satellite's positioning jets strikes other parts of the satellite, thus diminishing effectivity of inclination stationkeeping maneuvers. Thruster modeling errors are allegedly errors concerning thruster efficiency.

25. It was known before launch that plume impingement would occur, except NEW VALLEY alleges that its negative effects had been under estimated when fuel budgets endorsed to the policies were calculated.

26. NEW VALLEY misrepresented to the AA Mutual Defendants that the fuel budget for the life policy period was deterministic for the Westar satellites when in fact NEW VALLEY knew before launch that the effects of plume impingement were uncertain and that the satellite manufacturer had provided to NEW VALLEY only an estimate of the effects of plume impingement to be used in the fuel budget calculation.

27. If the facts alleged in NEW VALLEY's Proof of Loss are true, Westar IV was never capable of completing its 10 year design life.

28. If the facts alleged in NEW VALLEY's Proof of Loss are true, Westar V was never capable of completing its 10 year design life.

29. If the facts alleged in NEW VALLEY's claim are true, its prelaunch fuel budget for Westar IV was in fact not true.

30. If the facts alleged in NEW VALLEY's Proof of Loss are true, its prelaunch fuel budget for Westar V was in fact not true.

31. If the facts alleged in NEW VALLEY's Proof of Loss are true, its determination that the launch of Westar IV was successful, was in fact not true.

32. If the facts alleged in NEW VALLEY's Proof of Loss are true, its determination that the launch of Westar V was successful, was in fact not true.

33. The Policies only covered losses which were caused by fortuitous events which occurred, and which were known to have occurred, prior to the expiration of the Policies.

34. Plume impingement and thruster modelling errors are not fortuitous events.

35. Under the terms of the Policies, after October 1, 1984, coverage was limited to the specified risk of "loss of hydrazine", and Insufficient Fuel, as defined in the Policies, was no longer covered.

36. Under the terms of the Policies, after October 1, 1984, coverage was limited to "loss of hydrazine" resulting from causes which were "known to exist during the policy period".

37. NEW VALLEY alleges Insufficient Fuel subsequent to October 1, 1984, but does not allege loss of hydrazine.

38. NEW VALLEY alleges that prior to October 1, 1984 it did not know of the existence of a cause that would result in loss of hydrazine after October 1, 1984.

COUNT I

FOR BREACH OF CONTRACT (False representation and/or warranty of Successful Launch)

39. Paragraphs 1 through 38 of the Counterclaim are incorporated herein.

40. NEW VALLEY had a duty under the Policies to truthfully and accurately represent and/or warrant whether the launches of Westar IV and V were, or were not, successful. If the facts alleged by NEW VALLEY in its Proofs of Loss, concerning plume impingement and thruster modeling errors, are true, it breached its duty by falsely representing and/or warranting the success of those launches. The AA Mutual Defendants relied on this false representation and/or warranty and were damaged in that they erroneously paid to NEW VALLEY No Claims Bonuses for Westar IV and Westar V in their proportionate shares of the total amount of \$2,625,000 and were further damaged in that New Valley paid a proportionate share to the AA Mutual Defendants of the total of \$7,687,500 less in premium than the AA Mutual Defendants were entitled to under the Policies for launch insurance on Westar V and VI. Amounts stated above are approximate and may be such other amounts as are proved at trial.

COUNT II

FOR UNJUST ENRICHMENT

41. Paragraphs 1 through 38 of the Counterclaim are incorporated herein.

42. By reason of the foregoing, New Valley has been unjustly enriched in that it has paid \$7,687,500 less than it should have in insurance premiums and it has collected No Claims Bonuses in the amount of \$2,625,000 which it should not have received. AA Mutual Defendants are entitled to their proportionate shares of the stated amounts, which stated amounts are approximate and may be such other amounts as proved at trial.

COUNT III

FOR BREACH OF CONTRACT (False representation and/or warranty of the fuel budgets)

43. Paragraphs 1 through 38 of the Counterclaim are incorporated herein.

44. NEW VALLEY had a duty under the Policies to truthfully and accurately represent and/or warrant the fuel budgets for Westars IV and V. If the facts alleged by NEW VALLEY in its Proofs of Loss, concerning plume impingement and thruster modeling errors, are true, it breached that duty by falsely and inaccurately representing and/or warranting those fuel budgets and the AA Mutual Defendants relied on this false representation or warranty. The AA Mutual Defendants were damaged in that a claim is being made against them by NEW VALLEY for Insufficient Fuel under the life insurance coverage of the Policies.

COUNT IV

FOR DECLARATORY JUDGEMENT (Life insurance claim for Insufficient Fuel)

45. Paragraphs 1 through 38 of the Counterclaim are incorporated herein.

46. An actual controversy exists between the parties to the Policies in that NEW VALLEY contends that it has a valid claim under the life insurance section of the policy for Insufficient Fuel for both Westar IV and V caused by plume impingement and thruster modelling errors. The AA Mutual Defendants contend that the facts alleged by NEW VALLEY in its claim, concerning plume impingement and thruster

modelling errors, do not support a valid life insurance claim for Insufficient Fuel in that:

(a) the Insufficient Fuel loss alleged by NEW VALLEY was not an Insufficient Fuel loss; but was in fact, only an error in the fuel budget which New Valley represented and/or warranted to be true and accurate, and;

(b) the Policies cover only losses caused by fortuitous events occurring during the policy period and the Insufficient Fuel loss alleged by NEW VALLEY was not caused by a fortuitous event occurring during the policy period.

47. The AA Mutual Defendants wish a judicial determination of the rights and duties of the parties under the Policies and in particular a determination that NEW VALLEY has no valid life insurance claim for Insufficient Fuel.

COUNT V

FOR DECLARATORY JUDGEMENT (Life insurance claim for loss of hydrazine after the expiration of the Policies)

48. Paragraphs 1 through 38 of the Counterclaim are incorporated herein.

49. An actual controversy exists between the parties to the policies in that NEW VALLEY contends that it has a valid life insurance claim for loss of hydrazine for both Westar IV and V after expiration of the Policies. The AA Mutual Defendants contend that the facts alleged by NEW VALLEY in its claim, concerning plume impingement and thruster modelling errors, do not support a valid life insurance claim for loss of hydrazine after the expiration of the Policies in that:

(a) during the policy period NEW VALLEY did not know of the existence of any cause which would result in loss of hydrazine after the expiration of the Policies, and,

(b) no loss of hydrazine occurred after expiration of the Policies.

50. The AA Mutual Defendants wish a judicial determination of the rights and duties of the parties under the Policies and in particular a determination that NEW VALLEY has no valid life insurance claims for loss of hydrazine after the expiration of the Policies.

COUNT VI

FOR REFORMATION OF THE COVERAGE FOR LOSS OF
HYDRAZINE AFTER THE EXPIRATION OF THE POLICIES

51. Paragraphs 1 through 38 of the Counterclaim are incorporated herein.

52. By mutual mistake of the parties, or by the mistake of the AA Mutual Defendants and the fraud of NEW VALLEY in concealing knowledge of the mistake, the Policies do not express the true understanding of the parties in that the parties believed that coverage after expiration of the Policies was limited to loss of hydrazine, which resulted from a cause which, before the expirations of the Policies, New Valley knew to exist.

53. If the facts alleged by NEW VALLEY in its Proof of Loss are true, the Policies do not express the true understanding of the parties in that NEW VALLEY now claims that the Policies provide for Insufficient Fuel loss resulting from a cause which, after the expiration of the Policies, was known to have existed during the policy period.

54. The Policies should be reformed and revised to express the true intent of the parties with respect to coverage for loss of hydrazine after the expiration of the Policies.

WHEREFORE, Counterclaimants pray for judgement as follows:

(a) As to COUNTS I and II, return of the AA Mutual Defendants' proportionate share of the No Claims Bonuses in the approximate total amount of \$2,625,000, or such other amount as is proved at trial, and for the AA Mutual Defendants' proportionate share of the approximate total amount of \$7,687,500, or such other amount as is proved at trial, representing additional premiums due and owing for launch insurance on Westar V and VI.

(b) As to COUNT III, a setoff in an amount equal to the amount of NEW VALLEY's life insurance claims.

(c) As to COUNT IV, a declaration that NEW VALLEY has no valid life insurance claim for Insufficient Fuel for either Westar IV or V.

(d) As to COUNT V, a declaration that NEW VALLEY has no valid life insurance claim for loss of hydrazine after the expiration of the Policies.

(e) As to COUNT VI, reformation of the wording of the Policies which state: "Underwriters will pay for loss of hydrazine occurring after the expiration of this policy that

results from causes known to exist during the policy period." to read "Underwriters will pay for loss of hydrazine which occurs after the expiration of the policy but results from causes which were known, before the expiration of the policy, to exist."

(f) For prejudgment interest, attorney's fees and costs and for such other and further and different relief as this Court deems just and proper.

.....
Through mid-August 1993, hundreds of thousands of documents have been requested and reviewed, seventeen depositions have been taken [some individual deponents being questioned for as many as seven days] and hundreds of pages of discovery related motions have been filed. And European based witnesses are set to be deposed in October 1993, in London, England. All of this and discovery concerning technical engineering related issues in the case is not even underway. And entirely from what defendant insurers would allege is an ill-founded interpretation of several words in one sentence of a fifteen page insurance policy.

The Strategic Defense Initiatives and Conclusion

To prevent having to expend extraordinary resources in future U.S. venued space insurance related disputes and litigation, the following courses of action, which will be called strategic defense initiatives, are strongly recommended:

1. In future space related insurance policies, Insuring Agreements should contain no terms that it can even be argued are imprecise, ambiguous or conditional;
2. Insureds should be fully aware of the requirements to establish and prove a loss and should be prepared to respond promptly to reasonable requests of insurers for documents and information;
3. Insureds should fully explore all means of avoiding or diminishing losses at the time a claim is being considered; and
4. Insureds should keep all underwriting information current with insurers and continue to advise insurers of pertinent information up to the time of launch and thereafter.

Based on experience to date, by following the above simple recommendations, the likelihood of future space insurance related disputes and litigation arising in the United States can be greatly reduced.

A. Past Events

Reports

Prevention of an Arms Race in Outer Space: The Deliberations in the Conference on Disarmament in 1993

On December 9, 1992, the UN General Assembly adopted resolution 47/51 which requested the Conference on Disarmament (CD) to consider the Prevention of an Arms Race in Outer Space in 1993 as a matter of priority. The resolution called on the CD to build upon areas of convergence, taking into account relevant proposals and initiatives with a view to undertaking negotiations for the conclusion of an agreement, or agreements, as appropriate to prevent an arms race in outer space in all its aspects. Resolution 47/51, as well as previous reports of the Committee, recognized (a) the need to consolidate and reinforce the legal regime and enhance its effectiveness; and (b) the importance of strict compliance with existing agreements both bilateral and multilateral. Paragraph 9 of the same resolution recognized the growing convergence of views on the elaboration of measures designed to strengthen transparency, confidence and security in the uses of outer space. The resolution gathered an impressive degree of support as shown by a voting record of 164 votes in favor and none against. Therefore, the prompt establishment of the Ad Hoc Committee in January 1993 under the Chairmanship of Ambassador *W. Hoffmann* of Germany was welcomed by the members of CD as a positive move. Though the Committee once again failed to agree on a negotiating mandate, many delegations during the debates recognized that the work carried out so far by the Committee had prepared the ground for undertaking these negotiations in a concrete manner.

During this session the debates centered on the current legal regime, the need for its reinforcement, the existing proposals and some new initiatives with special emphasis on confidence-building measures. Some delegations suggested to discuss the Venezuelan proposal (document CD/851 of 2 August 1988), namely to amend Article IV of the 1967 Outer Space Treaty so as to expand the scope of the ban on weapons in space.

Of particular interest during this session was a new proposal by France dealing with the prior notification of launches of space objects and ballistic missiles. In its view, the goal of preventing an arms race in outer space could be gradually attained through a set of measures designed to ensure the security of space activities, to establish the illegal character of aggressive uses of outer space, and to increase confidence and transparency in space activities. Moreover, France considered that, since most space technologies could be used to produce ballistic missiles able to deliver weapons of mass destruction, there was a need to ensure, through increased transparency, that space technologies were not diverted to non-peaceful

uses. France, considering that the 1975 Registration Convention was insufficient, proposed that the Conference on Disarmament negotiate a new international instrument providing for the prior notification of launches of space objects and ballistic missiles and the establishment, under the auspices of the United Nations, of an international notification center with the task of collecting and disseminating the data notified by the launching States. A number of delegations supported this initiative, considering that it could offer a realistic solution to the present deadlock in the Ad Hoc Committee due to the demands for more far-reaching negotiations on the one hand, and the need for further discussions on the other. It was only the delegation of China which expressed doubts that the notification of launches of ballistic missiles should be directly related to the work of this Committee. Since ballistic missiles were not space objects, and their trajectory was mostly in atmosphere and thin atmosphere, it was not possible for them to cause collision of space objects. Therefore, China felt that the issue of notification of launches of ballistic missiles exceeded the Committee's mandate and should not be dealt with by it. A number of European delegations expressed the opposite view.

During the 1993 session the Committee continued to enjoy the assistance of two Friends of the Chairman who were appointed to deal with the issues of confidence-building measures in outer space and terminology and other relevant legal aspects relating to the prevention of an arms race in outer space.

The Friend of the Chairman (from the Russian Federation) dealing with CBMs analyzed all relevant proposals related to the elaboration of confidence-building measures in outer space activities submitted over the years by the members of the Ad Hoc Committee and presented the assessment in a number of documents. These proposals covered primarily the issues of the transparency of outer space activities (provision by States of more detailed information concerning planned and actual activities in outer space), the issues of elaborating a "code of conduct" and "rules of the road" in outer space, the issues of verification, as well as issues concerning the establishment of different international organizations that would favor the actual implementation of confidence-building measures. Based on the substance of the various working papers and the outcome of open-ended consultations, it appeared that the majority of the members of the Ad Hoc Committee supported, one way or another, the idea of using confidence-building measures as a first step towards finding an encompassing solution to the problem of preventing an arms race in outer space. This triggered the conclusion and a subsequent proposal by the Friend of the Chairman to widen and change the existing mandate of the Committee. In this regard the Chairman presented suggestions for the future work of the Ad Hoc Committee and its mandate proposing a negotiating mandate on CBMs. The majority of the delegations, members of the Group of 21, supported by China, while emphasizing that the scope of the mandate of the Ad Hoc Committee should not be narrowed and priorities in this field not altered, held the position that the Committee should be given a negotiating mandate encompassing all relevant aspects of the

prevention of an arms race in outer space. They reiterated that, because of their supplementary and interim nature, CBMs were not an end in themselves and their treatment in this Ad Hoc Committee should in no way detract, retard, or negatively affect, the attainment of its primary objective, namely, the conclusion of an international agreement, or agreements, on the prevention of an arms race in outer space, with a view to reinforcing the existing legal regime. Such an agreement, or agreements, should themselves include, and be the very cornerstone, of CBMs. Many other delegations shared and supported the view of the Chairman of the Ad Hoc Committee for the need to widen and change the nature of the present mandate to enable it to negotiate on CBMs. In this connection, for example, the Netherlands believed that the Ad Hoc Committee could engage in negotiating a set of CBMs concerning three different subjects;

- (a) reinforcing existing legal instruments;
- (b) notification of launches of ballistic missiles; and
- (c) information concerning space activities.

As for the reinforcement of the existing legal instruments, it stated that though the Outer Space Treaty and the 1975 Registration Convention did not have primary arms control functions, still certain Articles lent themselves particularly well for action of a confidence-building nature which could be codified in an agreement. For example:

Article IX of the Outer space Treaty could serve as a consultative mechanism to expand information which is provided on the basis of the Registration Convention;

Article X of the Outer Space Treaty provided linkage points for multilateral arrangements for observations of launches between States which have engaged in activities in outer space;

Article XI of the Outer Space Treaty could be elaborated so as to expand the obligation to provide information to the Secretary-General of the United Nations.

However, a few States believed that the Ad Hoc Committee had still not yet identified any aspect of space activities which would lend itself to negotiations.

To amplify the knowledge and the experience of the Committee in the field of CBMs, the Chairman, with the approval of the Committee, organized a number of expert presentations. Thus, *Prof. B. Bertotti* of Italy, in his Working Paper on the Regulation of Nuclear Power Systems in Near-Earth Space pointed out that, during the last decade there had been a growing concern over the use of nuclear power sources in space, because of a number of incidents involving satellites equipped with NPS. The danger to spaceships in transit was greatly increased by the spread of nuclear debris. Prof. Bertotti said that a total ban on space nuclear systems was impracticable. However, the situation could be regulated so as to prohibit the operation of nuclear power systems for propulsive purposes in low-Earth orbits. In this region only the transit or the assemblage of spacecraft carrying on board nuclear power systems should be permitted. A limitation of the use of nuclear power systems in outer space for propulsive purposes would help to avoid a risky activity which could

trigger, for instance, dangerous misinterpretations, should a satellite operating with a NPS, be it a civilian or a military object, crash in a foreign country. Such a proposal was also aimed at filling a gap in the current regime since the UN Resolution A/47/68 on "Principles Relevant to the Use of Nuclear Power Sources in Outer Space" did not regulate spacecraft using NPS for propulsion.

Dr. H. Feigl of Germany, made a presentation on Low-intrusiveness Measures for Monitoring a Protection Regime in Outer Space. He indicated that a protection regime for outer space based upon international cooperation was obviously more suited to meeting the interests of general safety as promoted by a Code of Conduct. Elaborating and applying adequate rules of conduct, which together with some specific restrictions or bans, may form an interactive setting of regulations. Measures like adequate prelaunch and notification procedures should be structured with due account of the monitoring task. In this connection, State parties offering prelaunch inspections could provide a high-leverage means in caring for the necessary proof of the declared intent. In-situ controls would allow a rather limited approach to be taken for post-launch monitoring of systems in orbit which otherwise may pose a heavy burden. Supervising "orbital behavior" by independently operated technical means would nevertheless be indispensable in certain cases. This was especially true for observations from the ground being accomplished under multinational custody. Within such a monitoring regime, rules-of-the-road would certainly retain their importance. In this context it might be important that cooperative means of on-board control (e.g. beacons or tags) would considerably add to the overall effectiveness of remote monitoring. To keep the diversity of monitoring measures might become a major issue for any attempt to secure low-intrusiveness control. An approach like this was all the more appropriate since supervision in a behavior related sense lent itself much more favorably to cooperative solutions and thus, from the very outset, to a substantial reduction in control efforts.

Dr. U. Ekblad of Sweden, defined CBMs as a set of measures with the aim of establishing confidence among States concerning their space activities. Addressing means for enhancing space security, he pointed out that pre-launch notification of space objects was of great importance for the enhancement of transparency and openness. Similarly, information on the maneuverability capabilities of space objects would greatly facilitate collision avoidance maneuvers. As alternatives to the term "keep-out-zone", he suggested to use terms like "warning zones" and "avoidance zones". He also advised that the physics of outer space, i.e. the laws of celestial mechanics, should be taken more into account in dealing with space security. In this connection, the insufficiency of the Registration Convention was pointed out. The expert also discussed the advantages of having an international trajectography center (the French proposal) together with pre-launch information. He equally considered the issue of the confidentiality of certain military space missions and how it could be kept. It would be important to discuss what type of information should be given, who should supply the information, and when it should be given.

Mr. H. Baccini (France CNES), described the procedures used for the national and international notification of launches of the European Launcher Ariane IV, in order to illustrate the French proposal for the notification of launches of space objects and ballistic missiles. He underlined that the existing systems for data collection and processing, as well as communication links, would facilitate the implementation of such a proposal.

Major K. Story of the U.S. Space Command, in his presentation entitled "Close Encounters in Space, The Keep-Out Zone Problem" discussed the impracticality of establishing keep-out zones around satellites as a means to protect satellites in space. He demonstrated that the orbital path of a satellite in unpowered space flight is determined at launch and that this orbital path is not easily altered and only at great cost to the lifetime and mission of the satellite. The physical principles of orbital mechanics dictate that the orbital planes of any two satellites in unpowered (normal) space flight will intersect and that these close encounters occur every day and pose no threat to satellite operations. Adding keep-out zones around satellites of a size relevant to protect against weapons would increase the number and frequency of encounters of satellites and would require maneuvering to avoid keep-out zones. Constant maneuvering (e.g. changing orbit) would be required to avoid keep-out zones of other satellites, increasing the difficulty of determining which satellite would be required to maneuver, regardless of what rules were applied (e.g. who was first in the new orbit). More important, the requirement to maneuver (x times per day) would take such a heavy toll on the lifetime of the satellite that it would most likely render satellite applications uneconomical, effectively precluding the peaceful uses of space by most, if not all, nations.

Dr. Mohamed Abdel-Hady of Egypt, in his presentation said that the establishment of an "International Satellite Monitoring Agency", proposed by France, using data from civilian open system satellites in its first phase of operation, and ultimately operating its own reconnaissance systems on a global scale for verification of disarmament treaties and monitoring of critical crisis areas in the world, could serve as a good purpose of confidence-building and in the enhancement of world peace. He indicated that an "ISMA" would cost the international community each year well under 1 percent of the total military expenditure. The presentation also demonstrated some specific examples of how sophisticated processing and applications of advanced software techniques of data from existing civilian satellites could be of value in military applications.

The discussions of the draft report of the Committee this year proved to be an even more difficult exercise than before. Therefore the consensus part of the report contains only one paragraph with the recommendation to the Conference on Disarmament to re-establish at the

beginning of the 1994 session that Ad Hoc Committee on this issue, with an appropriate mandate, taking into account the work undertaken since 1985.

Vladimir Bogomolov
Secretary of the Ad Hoc Committee
Conference on Disarmament

United Nations Committee on the Peaceful Uses of Outer Space Holds 1993 Annual Meeting in New York

The United Nations Committee on the Peaceful Uses of Outer Space held its thirty-sixth annual session at United Nations Headquarters in New York from 7 to 18 June 1993. The Committee, under the Chairmanship of Ambassador Peter Hohenfellner of Austria, continued its consideration of questions relating to international cooperation in space activities. As in the last few years, the discussions centered on cooperation and technical assistance between the space powers and the developing countries and were conducted in a more harmonious spirit than was generally the case in the 1980s. Russia played a low-key, cooperative role, while Ukraine described its space activities, and Kazakhstan, with Russian support, requested membership in the Committee.

The membership of the Committee has expanded several times since its establishment in 1959 and currently includes delegations from 53 States. This year, the Committee considered a further expansion, but was unable to reach agreement during the session. There was general agreement that Kazakhstan, home of the Baikonour launch site, should become a member. Western European members also supported permanent membership for Spain and Portugal, who have been rotating in three year turns in one seat, and for Greece and Turkey, who have similarly shared a seat. The Latin American and African delegations agreed to these proposals, on the condition that they each acquire two new seats to retain the regional balance. Agreement could not be reached on new member countries, due particularly to Western reservations over a proposal that Cuba be given one of the new Latin American seats. The Chairman was asked to continue consultations with delegations and an agreement on an expansion is expected next year. The Committee also agreed that the request of the Association of Space Explorers, an international organization of astronauts and cosmonauts, for observer status with the Committee and its subcommittees should be granted.

The principle items on the Committee's agenda were its annual reviews of the work of its two subcommittees, the Scientific and Technical Subcommittee, which met in February, and the Legal Subcommittee, which met in March-April. The Committee also considered two items specific to its meeting: spin-off benefits of space technology, and "ways and means for maintaining outer space for peaceful purposes." The latter item has in past years seen divisive debates over military space activities, but this year, while some concern was expressed over continuing military space activities, the debate was very civil.

Relocation of the Office for Outer Space Affairs

The Committee was informed of the decision of the Secretary-General, approved by the General Assembly, to reorganize the Secretariat, including relocating the Office for Outer Space Affairs to the United Nations facility in Vienna, Austria. The Office will also take over the servicing of the Legal Subcommittee, previously carried out by the Office of Legal Affairs in New York. As a result, the Committee and its subcommittees will hold their future meetings in Vienna, although the site of future meetings of the Legal Subcommittee, which has met alternately in New York and Geneva, will be reviewed following the 1994 meeting in Vienna. Most of the professional staff of the Office for Outer Space Affairs, including the Director, Mr. N. Jasentuliyana, have moved to Vienna and opened the Office there on October 4, 1993. One or two staff members will remain in New York until the end of 1993, at which time the New York office will disappear. The Office, previously part of the Department of Political Affairs, will become more autonomous as a result of the relocation.

Space debris

In a breakthrough after some years of contentious debate, the Committee this year agreed to add the question of space debris to the agenda of the Scientific and Technical Subcommittee so it could begin formal discussion of the question at its 1994 session, from 21 February to 4 March, 1994, in Vienna. In fact, the question has been under discussion for several years now but has not formally been on the agenda, due primarily to the United States position that further technical studies at the national level were required before formal international discussions would be productive. The Committee noted the need for further research on space debris, and in particular on the possibility of collisions between space debris and nuclear-powered spacecraft, and requested member States to provide the Subcommittee with information on national research. The Committee specified that the Scientific and Technical Subcommittee should, at its next session, consider scientific research relating to space debris, including mathematical modeling and other analytical work on the characterization of the space debris environment. Some delegations, particularly from developing countries, felt that the issue should also be taken up by the Legal Subcommittee, but the United States and other western delegations felt that was premature.

United Nations Programme on Space Applications

Reviewing the work of the Scientific and Technical Subcommittee, delegations expressed their satisfaction with the United Nations Programme on Space Applications carried out by the Office for Outer Space Affairs. The Committee approved the proposed programme for 1994,

including ten training courses, workshops and symposiums for personnel from developing countries, fellowships for advanced study in space institutions, technical advisory services, and dissemination of information on space applications for development. The Committee also reviewed and expressed its satisfaction with efforts to establish a series of regional centers for space science and technology education in developing regions. This year, as in the past, developing countries expressed concern over the lack of adequate resources for the Programme to meet the needs of the developing countries and to carry out the recommendations of the Second UN Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82, Vienna, 1982).

UNISPACE 3

Discussion continued on the proposal initiated by India in 1992 to organize a third United Nations space conference, UNISPACE 3, noting India's invitation to host the conference at its Space Center in Bangalore and to cover the extra costs involved in holding it away from the United Nations. The developing countries expressed strong support for the conference, while some developed countries had reservations over what such a conference might accomplish, but did not strongly oppose the idea. The developing countries recognized that the original proposal to hold the conference in 1995 was unrealistic, but hoped that agreement might be reached by 1995, allowing the conference to be convened in 1997. It was agreed that the Scientific and Technical Subcommittee would continue to study the question at its 1994 session, including consideration of objectives, organization, site, date and funding required.

Nuclear Power Sources in Outer Space

In 1992, after many years of discussions and negotiations in the two subcommittees, the Committee reached agreement on a set of principles relating to the use of nuclear power sources in outer space, and they were adopted by the General Assembly in a unanimous resolution. In response to United States concerns over some of the technical criteria in the principles, it was also agreed that discussions would continue in the two subcommittees and their working groups on the subject in 1993 in order to consider "future revision in view of emerging nuclear power applications and of evolving international recommendations on radiological protection." The United States, however, did not this year propose any changes to the principles, apparently because United States policy on the issue is still being formulated. A number of other delegations suggested possible ways to strengthen the principles, including improved definition of terms, expanding the scope of the principles to cover nuclear technologies not currently covered, and improving the criteria for risk assessment. There was general agreement that revision of the principles, if necessary, could best be done by adding to them or modifying specific elements as

necessary, rather than by renegotiating them as an ensemble. There were no texts of modifications proposed, and it was agreed that discussions would continue next year in the two subcommittees.

Legal Status of Outer Space and the Geostationary Orbit

The ongoing debate on the topic of the geostationary orbit has advanced somewhat in the last two years as the equatorial countries, notably Colombia and Ecuador, have dropped their claims of sovereignty or special rights over the portions of the orbit above their countries. Those countries and other developing countries, however, continued to call for some form of preferential rights for developing countries and countries with no previous geostationary satellites. These special rights would be embodied in some form of special legal regime to be elaborated for the geostationary orbit by the Committee on the Peaceful Uses of Outer Space. Western countries continued to oppose any special regime for the geostationary orbit, arguing that the 1967 Outer Space Treaty and the existing coordination procedures for geostationary satellites through the International Telecommunication Union (ITU) were quite adequate.

There was again no progress on the question of the definition of outer space, with developing countries calling for an agreed boundary between airspace and outer space, and western countries arguing that a formal definition would not be productive. There appeared to some progress towards a substantive discussion of the legal status of hybrid aerospace planes, as proposed in a working paper submitted by the Russian Federation. That paper raised the question as to whether such vehicles should be considered as space vehicles for their entire flight, as aircraft during non-orbital flight and spacecraft in orbital flight, or under some new special regime for such vehicles. Western delegations, however, continued to have reservations as to whether the proposed aerospace vehicles constituted a new situation that required new legal definitions or regimes.

Remote sensing and Environmental Monitoring

The Committee considered how it might contribute to the implementation of the decisions and recommendations of the 1992 United Nations Conference on Environment and Development, or "Earth Summit," held in Rio de Janeiro. The Conference adopted Agenda 21, containing recommendations for action in a wide variety of fields relating to the environment and development, as well as a Framework Convention on Climate Change and a Convention on Biological Diversity. The Committee reviewed a study prepared by the Secretariat on the applications of space technology in the implementation of Agenda 21, noting that many of the proposed environmental protection and sustainable development programmes proposed by the Conference would benefit from the use of satellite remote sensing and environmental monitoring. The Committee

requested its Scientific and Technical Subcommittee to review that report and consider further action, and in particular how the United Nations Programme on Space Applications could contribute to environmental protection and sustainable development.

Ralph Chipman

Chief, Committee Services and Research
Office for Outer Space Affairs
United Nations

Colloquium on the Law of Outer Space, Graz, Austria, October 18 - 22, 1993

The 36th Colloquium on the Law of Outer Space was opened by the Acting President, *Prof. Dr. I.H.Ph. Diederiks-Verschoor*, on Tuesday, October 19, 1993. She commemorated the late IISL President *Judge Manfred Lachs* who had passed away in January 1993. She recalled his impressive career in international law and his special devotion to the law of outer space as former COPUOS chairman and drafter of the 1967 Outer Space Treaty. She stressed that Judge Lachs will be sorely missed by the Institute which had deeply appreciated his innovative ideas and plans for the IISL since he was elected as its President in 1990. The audience respected a moment of silence in his memory.

The colloquium was attended by some sixty persons throughout the week, and the overall quality of the papers was impressive. Also, each session allowed ample time for discussions, and the limited number of papers enabled authors to present their papers in some detail. This was particularly appreciated by the participants. An important feature of this colloquium was that it hosted the finals of the second "Manfred Lachs Space Law Moot Court Competition" (the competition was named after Judge Lachs after his death, as he was a strong supporter of this initiative). This was the first time that preliminary competitions had been organized in Europe (by the European Centre for Space Law, ECSL) and in the US (by the AUSMIISL), whose winners met in the final round in Graz. The University of Leiden and George Washington University competed in a case concerning the commercial exploitation of the Moon, opposing two states, Xavage and Adastra. The court was composed of *Dr. N. Jasentuliyana*, *Prof. Dr. N.M. Matte* and *Prof. F. Lyall* (the only remaining Judge of the ICJ who was to chair the bench, Judge Guillaume, had to be missed because of French airline strikes). The team of the University of Leiden won the competition. Its members were *Ernst Boucher* and *Geoffrey van Leeuwen*. The members of the George Washington University team were *Guy Christiansen*, *Eric Edmondson* and *Charles Hildebrandt*. The case and the written briefs will be published in the IISL Proceedings. Each team also served as rapporteur for one of the sessions of the IISL Colloquium. The Competition will be held for the third time in Israel, October 1994, after preliminaries in Europe and the US. The case has already been distributed to numerous universities and deals with an international space station, intellectual property rights and liability for damage.

The topic of the first session of the Colloquium was "Legal Aspects of Activities of Organizations of the UN System and Other International Organizations". Dr. E. Fasan was the Chairman (replacing Dr. Jankowitsch who could not come), and E. Boucher and G. van Leeuwen (Netherlands) acted as Rapporteur.

Dr. A.M. Balsano (France/Italy) presented her paper on "Intellectual Property in Public Research International Organizations; the Example of ESA". Discussing patent protection, copyright protection and trademark protection, she emphasized the important promotional and innovative functions of Intellectual Property Management as well as its protection of space investment. Taking ESA - as a research and development organization - for an example, it was concluded that government organizations are not very active in protecting intellectual property, and that technical and economic feasibility studies should be carried out before protecting intellectual property.

Dr. S. Hobe (Germany) and Dr. P.H. Tuinder (The Netherlands) spoke about the "Corpus Juris Europeanus". The title of their paper was "Space Law related to European Space Activities: the Corpus Juris Europeanus". An assessment of the necessity of regional cooperation shows the importance of regional legal developments. The authors believe that European Space Law has already developed and that ongoing commercialization will influence its further development. The authors propose that a Framework of Sources of Space Law be made including European made law, and domestic space legislation.

"The Contribution of the International Astronautical Federation to International Cooperation in Outer Space and the IAF Constitution" was the title of the paper presented by Dr. V. Kopal (Czech Republic). Describing the history of the establishment of the IAF constitution and its preparation, the main goals were noted: to point out the purpose of the organization, the rules concerning membership, and the division of powers between a Bureau and the General Assembly in order to ensure effectiveness. Two amendments have been adopted to the original instrument. One was adopted in 1982 when the Principle of Consensus was adopted in order to surmount differences between voting and non-voting members, and the other in 1986 when a single class of membership was established, which widened membership from 10 to 128 members. The author concluded that the 1961 Constitution serves international cooperation, and that the IAF has played and will continue to play an important role.

Next, Prof. F. Lyall (Scotland) presented his paper: "The International Telecommunication Union Reconstructed". As a reaction to the dissatisfaction that had gradually arisen about the ITU's structural and organizational abilities to cope with modern requirements, a revision was made in 1992. Three sections were established: the Telecommunication Development Sector, the Telecommunications Standardization Sector, and the Radiocommunication Sector. Prof. Lyall regretted that membership to the ITU remains open only to states, and not to major telecommunication

organizations like INTELSAT, INMARSAT, and INTERSPUTNIK. While expressing reservations about the shift in qualification requirements for board members from technical to administrative, and the current system of contributions, the author does recognize the great potential of the recent restructuring.

Dr. J. Monserrat Filho (Brazil) discussed "The Place of the Missile Technology Control Regime (MTCR) in International Space Law". His paper aims to establish the legal relation between the principle of ballistic missile non-proliferation as fixed in the MTCR, and the principles concerning the free exploration, use and non-appropriation of outer space. An attempt is made to establish a hierarchy between these principles, and the author concludes that the place of the MTCR in International Space Law should be defined and qualified, and that it should be pointed out how its lawfulness and effectiveness can be optimized.

Prof. D. Popescu (Romania) addressed the "Historical and Legal Arguments for Setting up a "World Space Organization". Prof. Popescu referred to the many different international space organizations such as Intelsat, FAO and UNCOPUOS. There are 9 UN committees, 11 UN organizations and 8 intergovernmental organizations active dealing with space activities. In the author's view the Outer Space Treaty and the Moon Agreement (especially art. 11) also call for a "World Space Organization". Finally Prof. Popescu addressed the question what form the World Space Organization should have.

The next paper, presented by *Dr. Soon-Kil Hong* (Korea), concerned the "Legal Aspects of Space Activities of the International Civil Aviation Organization (ICAO) in Implementing Future Air Navigation Systems (FANS)". Dr. Soon-Kil Hong discussed the various activities of ICAO, especially the legislative and managing role in assuring a safe international air navigation system. The speaker underlined the importance of space activities of ICAO being in consistency with international air and space law.

The eighth paper was presented by *Dr. W. Stoffel* (Germany) who addressed the same issue as the previous speaker under the title "Legal Aspects of Aeronautical Mobile Satellite Services: the ICAO FANS Concept". The speaker made some additional comments to those made by Dr. Soon-Kil Hong. Dr. Stoffel believes that the problem with the ICAO FANS concept lies with the principle of state responsibility and liability. It might be very difficult to determine the liable state. Another obstacle may arise from the fact that the regulatory regime established by the ITU is applicable. In fact, the problem is that a sovereign state has the right to regulate telecommunications services within his sovereign territory including the airspace above that territory.

Two papers were represented by others than the authors in view of their absence. The paper by *Dr. S. Courteix* (France), "Is it Necessary to Create a World Space Organization?", was presented by Dr. M. Bourély. In view of growing cooperation between states with regard to space activities, the author recommends the creation of a "World Space Organization". The paper describes the tasks and the form of the organization to be.

The paper by *Prof. P.B. Larsen* (USA), "Navigation by Global Positioning Satellites (GPS): Legal Issues", was presented by *Prof. Lyall* and tackled the different legal issues with regard to GPS. The question presented in this paper is whether it is possible and necessary to regulate navigation by GPS in one legal regime. Problems arise with the Outer Space Treaty and the Liability Convention with regard to liability.

In the discussions that followed the presentation of the papers, *Amb. E. Finch* (USA) asked *Dr. Kopal* about the relationship between the IISL and the IAF. *Dr. Kopal* elaborated on the importance of The Hague as a legal city; the first Colloquium was held there. The second was held in London and the third in Stockholm. The IISL was founded there. Although the IISL and the IAF work together, the IISL is relatively independent. *Prof. C.Q. Christol* (USA) mentioned that he wrote an article about the early history of the IAF and the IISL. After a question from *Mr. M. Orrico* (Mexico) concerning the character of the IAF, *Dr. Kopal* elaborated on the importance of the status of IAF as an observer to UNCOPUOS.

Commenting on *Prof. Lyall's* paper concerning the ITU, *Prof. C.Q. Christol* asked *Prof. Lyall* whether there was an analogy between the financing problems of the ITU and those of the UN. *Prof. Lyall* held that the discrepancy between the amount paid to ITU and the number of votes which developed countries have in return is too big. *Dr. W. Stoffel* noted that the financing system of the ITU will be changed.

Mr. A.A. Golrounia (Iran) stated with regard to the paper by *Dr. Balsano* that developing countries should have free access to information from satellites. *Dr. Balsano* commented that protection does not mean that free access is impossible. It only means that access may be refused to some states or users. But access for developing countries remains often free.

Dr. S. Hobe (Germany), in commenting on the papers by *Dr. Popescu* and *Dr. Courteix*, wondered whether the proposed World Space Organization would be similar to the Deep Seabed Authority which has not been a success, to say the least. *Dr. Bourély* replied that the main idea is a flexible and independent UN space division. *Amb. E. Finch* argued that the world Space Organization is not a new idea. He also stressed that the Law of the Sea should be detached from the Law of Space and that comparisons cannot be made between the two. *Dr. H. Safavi* (Iran) countered that the Law of the Sea, Air Law and Space Law cannot be disconnected. *Dr. Popescu* elaborated on the different conditions of any World Space Organization; all or many nations should participate and the World Space Organization must be in accordance with Art. I of the Outer Space Treaty. Finally, *Prof. K.H. Böckstiegel* (Germany) came back to the remark made by *Dr. Hobe* and agreed with him that a World Space organization should not resemble the Deep Seabed Authority because that was a failure. The Moon Agreement, especially because of Art. 11, must also be regarded as a failure. A technical organization would work, an international regime would certainly not. Hereafter the chairman ended the discussion and closed the first session.

The second session of the Colloquium was held on Wednesday 20 October and dealt with "Adjudication and Arbitration of Disputes Regarding Space Activities". Dr. W.B. Wirin (USA) was Chairman, and E. Edmondson and Ch. Hildebrandt (USA) were the session's rapporteurs. The chairman proposed a different approach for this session by providing opportunity for discussion after each presented paper instead of at the end of the session.

The first paper was presented by Prof. Dr. K.H. Böckstiegel (Germany) and was entitled "Arbitration of Disputes regarding Space Activities". The author pointed out that arbitration has advantages over court litigation because it is more predictable, cheaper, confidential and more enforceable. Arbitration is the preferred method of dispute resolution in international disputes, particularly in the private sector. Prof. Böckstiegel foresaw that while the rules for settlement of disputes are codified, these rules are not sufficiently detailed to meet the likely expanding needs of the foreseeable future.

The Chairman Dr. W.B. Wirin (USA) asked in what circumstances a judicial resolution would be preferable to arbitration, and Dr. Böckstiegel responded that this could be the case when enforcement of the arbitral award is not ensured, e.g. in a state that has not ratified the New York Convention.

Amb. E. Finch (USA) asked the author's comment on the rules of evidence and how they may affect arbitration. Dr. Böckstiegel remarked that the rules of evidence are left to the discretion of the arbitrators, and that all parties must know and agree to the rules in advance.

Finally, Mr. L. Bencock asked whether or not arbitration proceedings establish precedent. Dr. Böckstiegel replied that the confidentiality of most proceedings prevent their use as precedent, although abstract descriptions of decisions may have some persuasive value.

Dr. M. Bourély (France) presented the next paper, "The Creation of an Aerospace Court of Arbitration", which presented the creation of a new court of arbitration that has been proposed by the Association Française de Droit Aérien et Spatial, to deal specifically with aerospace disputes. This arbitral court is intended to provide the expertise not found in existing courts of arbitration. The court would be seated in France and established in accordance with French law. Arbitrators would be selected on the basis of their expertise in the aerospace field, and the court's rules would be designed to accommodate the kind of disputes submitted to it.

Prof. I.H.Ph. Diederiks-Verschoor (Netherlands) noted during the discussion that an international court of justice and an international court of arbitration already exist, and that both have many judges who are competent and experienced in space related disputes. She further stated that the justifications presented by Dr. Bourély for the creation of a new court of arbitration did not seem sufficiently convincing to her. Dr. Bourély responded that the new court of arbitration would not conflict with the ICJ because it would not hear interstate disputes.

Ms. T. Masson-Zwaan (France) asked about the status of the ILA Draft Convention on the settlement of disputes, and *Dr. Böckstiegel* indicated that the draft convention has been put on the "back burner" as COPUOS is currently occupied with the issue of space debris.

Prof. C.Q. Christol (USA) asked whether public intergovernmental organizations could submit their disputes to the proposed court. *Dr. Bourély* replied that while the new court will not have competence to hear inter-state disputes, it *might* be able to address disputes involving intergovernmental organizations.

Dr. D. Popescu (Romania) asked if this new court would require a new international convention, and the author answered that the proposal is for a voluntary administrative and judicial body, and does not require a new international convention.

The question of the financing of the court was raised by *Mr. J. Pelton*, and *Dr. Bourély* indicated that funding would be provided by the parties submitting their disputes to the court.

Prof. S. Gorove (USA) then asked whether one could use the proposed court to enjoin a launch in the US, and *Dr. Bourély* said that the court lacks competence to do so.

Ms. T. Masson-Zwaan (France) asked *Dr. Bourély* whether the ESA Convention provides for binding arbitration, which was confirmed by the author, who also indicated that no disputes had been arbitrated so far.

Mr. S. Hobe (Germany) wondered whether the changing environment in the space industry, from predominantly governmental activity to increased private activity, will increase the demand for dispute resolution. *Dr. Böckstiegel* replied that this was certainly true. The breakdown of the court system in Eastern Europe combined with the diminished clout of government agencies has led contractors to demand more arbitration. This was confirmed by *Prof. Christol* who noted that more private activities in space will create more controversies and more arbitration. *Prof. Gorove* however remarked that some national laws will require disputes to go to court instead of arbitration, because of the more binding character of a court decision.

The third paper in this session was written by *P. Sterns and L. Tennen* (USA) and was presented by *Mr. Tennen*. The paper gave an extensive overview of "Resolution of Disputes in the Corpus Juris Spatialis: Domestic Law Considerations". It examines traditional litigation in the US and compares it to Alternative Dispute Resolution (ADR) Mechanisms, in particular arbitration. *Mr. Tennen* noted that traditional litigation is extremely costly and time-consuming in the US, particularly because of the expensive discovery provisions in American law. ADR provides a cheaper, more predictable and quicker way to resolve conflicts. In the discussion around this paper, *Dr. E. Fasan* (Austria) asked about the possibility of appealing an arbitrary decision. *Mr. Tennen* responded that both the FAA and the UAA provide for appeal in such cases, and *Dr. Böckstiegel* confirmed that there are limited grounds for challenging the enforcement of arbitral awards in international agreements such as the New York Convention.

Mr. D. Brown (engineer at Estec, the Netherlands) asked whether arbitrators can issue injunctions. Mr. Tennen said yes, but that the party seeking the injunction must show a likelihood of winning on the merits, a likelihood of irreparable harm, and must post a substantial bond. Dr. Christol noted that arbitrators with the proper technical expertise can be found by word of mouth, through lists provided by Bar Associations and through "Rent-a-Judge" services.

Finally, Dr. Böckstiegel reported that the Board of Directors of the IISL has decided to establish a Committee on dispute resolution and cases regarding space activities with the goal of publishing a loose-leaf series, and invited interested persons to contact the Secretary, Ms. T. Masson-Zwaan.

Since Prof. S. Gorove (USA) had to leave the Colloquium earlier, the Chairman allowed him to present his paper in this session. It dealt with "Recent Litigation Involving the Launch of a Spacecraft with NPS on Board" and reported on two recent US cases in which environmental groups attempted to enjoin the launch of the Galileo and Ulysses spacecraft on the grounds that the Environmental Impact Statements (EIS) filed by NASA did not properly assess the risks of a release of radioactive material if an accident occurred at launch. Prof. Gorove stated that in the Court's view the EIS met all the requirements of the law, including risk assessment and alternatives, and the Court refused to issue temporary restraining orders noting that the immense cost-overruns associated with a delay in launch would be against the public interest. The author then stated that it would be interesting to compare the safety assessment required by the somewhat later adopted NPS Principles to the EIS required by US law. Mr. D. Reibel (USA) noted regarding this last paper that the National Environmental Policy Act (NEPA) is a procedural law and the NPS Principles are primarily substantive, so no real comparison could be made. Prof. Gorove noted that Principle 5 of the NPS Principles requires a safety assessment to be made, and Chairman Dr. Wirin added that the NPS Principles will become part of the NEPA process if they become a treaty to which the US was a party.

An additional paper on "Adjudication and Arbitration of Disputes Regarding Space Activities" was presented by Dr. H. Safavi (Iran). He noted that with the increase of human presence in space, more disputes will arise. Increased disputes will require substantive laws to deal with criminal and civil conflicts in space.

Finally, the invited paper by Mr. M. Potter (USA) who could not come was presented by the Chairman. The subject of the paper was "European Regulation of Competitive Satellite Services: Battling the Cartel and the Monopolies". The European satellite services market, including television broadcasting, private business networks and voice telecommunications, has been hurt by cartel-like practices and pricing of telephone monopolies. Today's business needs, technological developments and regulatory changes are threatening these cartel and monopoly structures. By examining these developments, the author is able to find

several strategies for bypassing the barriers presented by the Eutelsat cartel and monopolies. Hereupon the Chairman closed the session.

The subject of the third session of 21 October 1993 was "Legal aspects of space insurance". The session was chaired by *Prof. T. Kosuge* (Japan) and *Ms. K. Gorove* (USA) was the Rapporteur. *Dr. G. Catalano Sgrosso* (Italy) presented the first paper entitled "Insurance Implications about Commercial and Industrial Activities in Outer Space". The paper discussed the evolution of the insurance market, analyzed the clauses found in insurance contracts including those limiting liability and the cross waiver of liability clauses, pointed out the various kinds of policies available, i.e., pre-launch, launch, and life in orbit, examined the different treatment by the Americans and Europeans of third party liability insurance, and then finally surveyed the treatment of liability and insurance issues within the framework of European Community Law. With respect to the latter, she analyzed the concept of great risk that was dealt with in EEC Directive, No. 357 of June 22, 1988, concluding that the greater liberalization permitted by that directive will allow insurance companies to offer globally more products suitable to clients' needs. She then continued with a discussion of EEC Directive 92/49, June 18, 1992, suggesting that the resulting increased competition among insurance companies will benefit clients.

The next paper "Development of Space Activities and Insurance" was prepared by *Yoshitane Kitano* (Japan). The paper noted that currently the space insurance market has a capacity of approximately 500 million dollars for liability insurance and 200 to 350 million dollars for single or dual launching of satellites. It stressed that the space insurance market will have to respond with extended capacity, but that could only be done by developing ideas on how to leverage the capacity without jeopardizing the market's well-being. In demonstrating his thesis, the paper gave an overview of the history of the space insurance market. It was pointed out that in recent years, insurance companies have begun to have enough information at their disposal to be able to charge different rates for different launch vehicles, but that it was hard to know, for example with the Soviet Proton, whether its reliability would continue. Moreover, with so few launches a year, it was difficult to have true accuracy as to the risks.

D. Reibel (USA) presented a paper on "Space Insurance and the Legal Aspects of Allocating Risk and Liability Among State and Private Entities". His paper examined the relationship of space insurance to the allocation of risk and liability among state and private entities in the U.S. He gave an overview of the nature of the space insurance market and analyzed in detail the implication of two recent federal appeals court cases: Martin Marietta Corp. v. INTELSAT, 978 F.2d 140 (4th Cir. 1992) and Hughes Communications Galaxy, Inc. v. United States, 998 F.2d 953 (Fed. Cir. 1993). For the former, he pointed out that the court's holding means that sophisticated contracting parties will normally be precluded from making claims of negligent misrepresentation and tort and will be held to the duties that were imposed by the contract, except that liability for gross

negligence can never be waived by contract. For the latter case, he noted that the Court placed costs of governmental policy changes with the government and not on its private contracting parties. In conclusion, he offered several recommendations to facilitate the efficient operation of the space insurance market.

The paper of *H. Yoshida* (Japan) on "Accidents of Space Activities and Insurance" addressed the nature of launch-related losses, pointing out that the highest incidence of failure has occurred during the transfer phase from LEO to GEO. He focused his paper particularly on the nature of satellite failures and the main cause of failures. Of particular interest was the fact that nearly 34 % of all known failures occurred on the first satellite of a series, which appears to have twice the likelihood of failing as the second unit. His paper also addressed alternatives to the insurance market, noting that some firms have begun to ask the satellite manufacturers to become the risk manager for the entire satellite program, through on-orbit check-out and delivery, with the costs of risk management built into the contract price. In addition, his paper offered an overview of the evolution of Japanese and American space transportation architecture.

F. Yamazaki (Japan) gave a paper on "Space Debris and Space Insurance." He noted that damage to satellites from debris is covered by insurance, but that currently insurance costs are not affected by debris risk. In the future, however, he hypothesized that if debris continues to grow at its current rate, insurance may be affected.

T. Wright (U.K) and *J. Masson* (France) presented a paper on "Space and Satellite Insurance". The paper summarized completely insurance in the space industry, addressing reasons for insuring, the Superbird case, commercial communication satellite launches, risk and exposure identification process, risk timeline for satellite project exposures, insuring against risk, contractual aspects, insurance policy, claim handling, and the broker's role. Of particular interest are the risks covered by each type of insurance policy during each phase of a launch. Pre-launch coverage indemnifies the insured against satellite damage during the manufacture, storage, transit and on-site assembly phases and usually terminates at the intentional ignition of a launch vehicle. Normally this risk is assumed by the spacecraft manufacturer. Insurance can be for loss of revenue and/or extra expenses incurred due to launch delay. Launch coverage indemnifies the insured for the cost of replacing the spacecraft, re-launch services and the loss of related revenues. It normally begins with the intentional ignition of the launch vehicle and extends through in-orbit delivery which can be up to 180 days. Premiums are currently around 17-18% of the sum insured. Satellite In-Orbit Coverage is around 1-2% of the insured sum. Launch Risk Guarantees are provided by some launching agencies such as Arianespace and provide for either a replacement launch and associated extra-expenses or a re-fund in the event of a failure. Coverage ends when the launcher reaches LEO. For liability insurance, U.S. launching companies are required to procure up to \$500 million for their customers and Arianespace provides 400 million Francs coverage. Both the U.S. and France agree to bear the costs above the

coverage amount. Insurance is also available to the satellite user for transponder failure.

P. O'Connor (USA) concluded the session with a presentation on "Liability Risks for Commercial Launch Services in the CIS". He outlined the launch services available in the CIS, the liability risks, the responsibility, and risk management responses. He focused much of his analysis on LKE launch services, an arrangement between Lockheed Corporation, Khrunichev Enterprises (Russia), and NPO Energia (Russia). He analyzed the interesting results with respect to responsibility and liability that arise, particularly since one of the launching facilities is in Kazakhstan. He also addressed the consequences of application of the Commercial Launch Services Act, US, to LKE launch services.

Dr. T. Kosuge of Japan as chairman of the session moderated the discussions. Dr. Priyatna (Indonesia) commenced the questioning asking for further specification as to the factors that raise the costs of space insurance and for the insurance agents' views of the scope of arbitration. With respect to the first question, Dr. Wright responded that the costs of insured space-related accidents affect the costs of insurance. After further questioning by Dr. Lyall, he also admitted that the space insurance market can become affected by the world-wide disaster market. Dr. Wright noted that with respect to the question relating to arbitration, that he had not seen any long-running disputes between insurer and insured. Dr. Böckstiegel pointed out that insurance-related arbitrations would often involve an injured third party. An engineer from the ITU, Dr. Meyerhoff asked for clarification as to the term "market capacity." Dr. Wright responded that the market capacity for an event is all of the amount of money that can be put towards insuring a particular event. Currently, 370 million is available for insuring any one launch. Dr. Wirin asked whether engineers were currently involved in assessing risk, because they had not been involved in the early days of space launchings. Dr. Wright acknowledged that they were indeed involved. Dr. O'Connor pointed out that a large number of losses of the space industry have not been insured. Therefore, the insurance premiums are lower than would be the case had, for example, the U.S. losses of more than 2.5 billion been insured. Dr. Christol asked the manner in which insurance companies provide for the needs of the procurer of a launch. The response was that a number of insurance options were available to cover risks that were not provided for in the launching contract. For example, insurance could be purchased by the launch procurer for a launch delay or for a launch failure.

The last session of the Colloquium was held on Friday 22 October 1993 and dealt with "Recent Developments in Space Law with Special Emphasis on Nuclear Power Sources". The session was chaired by Prof. F. Lyall(UK). Ms. C. Smith (France) was the Rapporteur.

The first part of the session dealt with Nuclear Power Sources. Prof. C. Christol (USA), in his paper "Nuclear Power Sources for Space Objects: a New Challenge for International Law", analyzed four aspects of the UN Nuclear Power Sources principles: the positive provisions of these

principles are the restricted use of NPS and the safety assessments. The second aspect is negative: the principles are, in most cases, quite vague and general. The main issues described are how to identify the procuring State and the launching State. The neutral aspects related to the final form for the principles, since they cannot claim the status of customary international law. Finally, some principles appear to be uncertain, considering their geographical applicability.

Next, *Prof. A. Cocca* (Argentina) dealt with the question "Are the Principles on the Use of Nuclear Power Sources in Outer Space a progress in space law?" He criticized the UN Resolution, its imprecise drafting and the lack of moral fundamentals of technology on which they are based. In his view, the principles should be reformulated and moreover new principles should be added towards a binding instrument, as happened with Resolution 1962 (XVIII) and the Outer Space Treaty. *Amb. Cocca* also presented the conclusions of the paper by *M. de la Mercedes Esquivel de Cocca* (Argentina) on "Nuclear Power Sources Principles, Space Contamination and Human Space Settlement".

Dr G. Hacket (Austria) presented a very complete study and analysis on "The Legal Regime for Nuclear Power Sources in Outer Space". After having exposed the technical aspects, he focussed on existing international law relating to NPS, other than the UN principles on the use of NPS in outer space. This includes treaty law referring to the private operator, to the launching State and customary law. The third part of the paper analyses the UN principles with emphasis on notification, responsibility and liability. The author mentioned the conflicting interests which may arise when negotiating principles on a subject where only two countries have the technical and financial means to engage in a form of technology which benefits only them as opposed to the rest of the community of States.

Next, *Dr. N. Jasentuliyana* (UN) provided "An Assessment of the UN Principles on the Use of Nuclear Power Sources in Outer Space". He addressed the possible ways in which the principles may be strengthened during the mandated review process. He also discussed the mechanism for that process and recalled that the goal of the Principles is not to limit the use of NPS systems in any way, but merely to determine the best ways in which they can be utilized.

In his presentation on "UN, US, CIS Space Debris Position, Heavenly junk", *Amb. E. Finch* (USA) presented the views at the United Nations of their positions. He stressed the importance of concluding an international treaty on Nuclear Power Sources and one on space debris. He also proposed an amendment to the Registration Convention: two hours before launching, information about the object and whether or not it carries an NPS should be sent to the Secretary General and should be confirmed after the successful launch. This proposal met a favorable audience.

After these presentations, a *discussion* was engaged. *Dr D. Reibel* (USA) requested a precision concerning one of *Amb. E. Finch'* ideas. He noted that the American Bar Association urges the preparation of an international convention that would provide for the prevention of the

creation of space debris and the pollution of outer space in any manner whatsoever "to the greatest extent feasible and practical and consistent with each nation's national security". He wondered about the use of this principle in case space debris must be created for national security purposes. *Amb. Finch* answered that the idea is to try *not* to create space debris, at all times. Then *Prof. C. Christol* agreed with *Amb. A. Cocca* on the point that there is definitively a problem with the UN NPS principles especially regarding the definition and identification of the Launching State and the Procuring State. He stressed that this raises substantial legal issues concerning liability.

Dr. N. Jasentuliyana (UN) confirmed that the question of the identification of the launching State and the procuring State in the NPS Principles is a very important issue which needs to be studied. The UNCOPUOS has not yet gone that far in their discussions.

After this discussion on the papers dealing with NPS, the other papers in this session were presented. *Dr. G. Gál* (Hungary) spoke on "Air Crew and Space Crew - Comparative Observations De Lege Ferenda". From April 1961 until today, 299 persons from 26 nations participated in manned space flights. The author stressed the lacks and uncertainties in the legal framework for manned flights and focussed on the National Aeronautics and Space Act of 1958 as well as the very recent Law of the Russian Federation on space activities of 20 August 1993. There is a strong will among authors to "initiate and promote international discussion in the hope that eventually they will lead to negotiation between interested states". *Dr. Gál* then compared the legal regime of air crew and space crew and pointed out that the recent emergence of space passengers may lead to further developments of space law concerning manned flights.

This was followed by a paper on "The Space Agency Forum (SAF) and International Cooperation", written by *Dr. Ellene Galloway* (USA). She presented the Space Agency Forum, which emerged from the successful experience of the SAF for the international space year (SAFISY). She stressed that the existing world space system badly needs coordination. This worldwide organization, which was created this year, will enhance international space cooperation. The Forum has a coordinating role as well as an implementing role, and it should become a place where information is available. *Dr. Galloway* concluded by recommending the creation of a computerized data bank within the SAF.

Prof. T. Kosuge (Japan) talked about "Satellite Broadcasting and Communication Services Provided by Private Sectors and Space Law". One of the most developing applications of satellite communication systems has been used in the TV broadcasting area. Various transborder TV broadcasting systems via satellite exist: in the Asia-Pacific region (Asiasat, Palapa), and in the the European region (Astra and Eutelsat). The author presented the legal and policy issues of these systems and proposed the elaboration of new rules for transborder TV broadcasting via satellite. In his view, international recognition of transborder TV broadcasting and an international regime are required.

Dr. M. Mejía-Kaiser (Mexico/Germany) discussed the interesting question: "An International Remote Sensing Cartel?" Since marketing of remote sensing data is performed by a limited number of participants (Landsat, Spot, IRS, Bhaskara, MOS, JERS, ERS) and since most of them are private companies with strong state participation, a coordination among them is evolving in order to develop the current incipient market. The author believes that the form of a Cartel could help "to increase the output and to reduce the price to a competitive price". It would fix prices and result in geographical allocation and coordination of markets.

Dr. S. Sanz Fernández de Córdoba (Spain) presented "Changing Basic Space Laws: Popularity, Pragmatism and Historical Lessons". In his view, since 1969, when the first man walked on the Moon, no significant progress was made in the conquest of space. The reasons are price and technology related. The author believes that the Outer Space Treaty of 1967 is one of the main reasons for the present situation, since it stated that outer space cannot be appropriated or exploited for private benefit. If these principles are maintained, sooner or later people will disregard the law and will be confronted with a "de facto" lawless colonization and appropriation of outer space. To prevent this, a more pragmatic set of enforceable rules is needed, to limit the rights of States and private entities willing to engage in space colonization.

This paper was followed by the presentation of "The Illogical Link: Launching, Liability and Leasing" by *Dr. F. von der Dunk* (The Netherlands). He noted that more private entities tend to become involved in space activities, which raises the problem of leasing spacecraft. Questions arising in this regard focus on such issues as ownership, whether state or private, in view of the registration obligation, and liability. After analyzing the relevant provisions of the Outer Space Treaty, he concluded that those provisions create a link between launching and liability which in some respect is illogical. A study of the ways in which the US and France cope with this illogical link, through national provisions concerning liability, is provided. The author concluded by stressing the necessity of amending - or at least re-interpreting - the relevant parts of space law.

The last paper was presented by *Dr. K. Gorove* (USA) and concerned "Responsibility and Liability under the NPS Principles: Can Customary Law Fill the Gap?" She examined Principle 8 pertaining to responsibility and Principle 9 pertaining to liability and compensation in light of the distinction drawn by the International Law Commission. The author observed that there are some situations which cannot fall under these principles, and which therefore create a gap. For instance, a State can be responsible for damage under Principle 8, but cannot be held liable under Principle 9 because it is not the launching State. Dr. Gorove concluded that some gaps can be filled by customary law or by the draft article on state responsibility as set forth by the ILC.

In the *discussion* which followed the presentations of this fourth session, *Dr. Yturriaga* (Spain) stressed that a new position on the colonization of space is required. The seabed regime is still not

implemented, because when States invest in the exploitation of the seabed, they wish to secure compensation for their investment. A compromise must therefore be reached in order to make it profitable for the explorer while maintaining the principle of *res communis*.

Referring to the paper by *Dr. F. von der Dunk*, *Prof. K. H. Böckstiegel* stressed the gap of the liability convention which does not apply to the second or third State in the row, if it is not implied in the launching. He mentioned that in present launching contracts, cross-waivers of liability are included, also in contracts with a third state, because otherwise it could become liable. He also noted, referring to *Dr. K. Gorove's* paper, that the draft of the ILC on responsibility is not yet customary international law, but if it were, it could become a complement to the Liability Convention.

Hereafter, the IISL Acting President *Prof. Dr. I.H.Ph. Diederiks-Verschoor* closed the 36th Colloquium on the Law of Outer Space. The 37th Colloquium will be held during the International Astronautical Congress in Jerusalem, Israel, 9 - 14 October 1994.*

*Tanja L. Masson-Zwaan***

IISL Secretary/ Colloquium Coordinator

Comments

The Mexican Position Before the U.N. Committee on the Peaceful Uses of Outer Space⁺

This comment focuses on the Mexican position shared by a great number of Latin American countries and by other developing nations during the Thirty-Second Session of the Legal Subcommittee of the U.N. Committee on the Peaceful Uses of Outer Space (COPUOS).

Mexico reiterated its position regarding the adoption of effective measures for keeping outer space free from military confrontations and for putting a halt to the growing militarization. Mexico also continued its struggle to achieve that all related activities would be carried out for the benefit and interest of humanity. In addition, Mexico once again insisted

* Information about the Colloquium, the session topics and the procedure for the submission of papers as well as the Manfred Lachs Space Law Moot Court Competition can be obtained from the IISL Secretariat, 3-5 rue Mario Nikis, 75015 Paris, France, tel. 33-1-4567 4260, fax 33-1-4273 2120.

** The author wishes to express her special thanks to *Ernst Boucher* and *Geoffrey van Leeuwen* (Leiden University, The Netherlands), *Eric Edmondson* and *Charles Hildebrandt* (George Washington University, USA), *Katherine Gorove* (Budapest, Hungary), and *Catherine Smith* (University of Paris, France), without whose able rapporteurship and prompt and accurate submission of session reports this colloquium report could not have been realized.

+ The views expressed herein are those of the author and not necessarily of any organization with which he is connected.

upon the establishment of a relationship of cooperation between COPUOS and the Ad Hoc Committee of the Disarmament Conference in charge of reviewing the matter of militarization of outer space.

Within the foregoing context and in relation to the Agenda of the Legal Subcommittee, Mexico's interventions clearly established its position as indicated in the following summaries:

a) Regarding the "Principles Relevant to the Use of Nuclear Power Sources in Outer Space," Mexico stressed that the adoption of the principles in this matter reflected advances in the progressive development of international law regarding outer space when a political will to do so had been present. Nonetheless - considering the general interest of having a more complete Spatial Law and avoiding that the approved principles be surpassed due to accelerated technological advances and bearing in mind that the revision exercises are to be carried out two years after the principles have taken effect - it is necessary already now to complete and optimize everything related to security evaluations and contemplate the methods for resolving eventual disagreements that may be raised by a third country regarding the security evaluations that must be carried out before each launching.

It is therefore very convenient to identify as of now the existing inaccuracies and gaps with the purpose of making concrete recommendations in the years that follow, thus strengthening the efficiency and applicability of the principles at the time of their utilization. An eventual reviewing of the scientific and technical provisions of the principles should be based on circumstances that could arise within the indicated areas.

b) Regarding the matter related to the "Definition and Delimitation of Outer Space and to the character and Utilization of the Geostationary Orbit, including the Consideration of Ways and Means to Ensure the Rational and Equitable Use of the Geostationary Orbit Without Prejudice to the Role of the International Telecommunication Union," Mexico maintained that in view of the existing irreconcilable positions and criteria regarding the delimitation of air space and outer space, it would be convenient to break the deadlock in the debate over delimitation. As a result, Mexico proposed a new form for dealing with the matter. This new approach starts with the identification of those specific matters on which the Legal Subcommittee of COPUOS could concentrate its deliberations for the purpose of reaching agreement on the adoption of legal principles in the future by temporarily withdrawing from the delimitation issue on which an agreement has never been reached due to the conflicting positions. The aforementioned procedure should be carried out without prejudicing or affecting the positions held by each country regarding the delimitation issue. In this connection, Mexico also stressed the importance of relying on the technical opinion of the O.A.C.I. on matters related to the use of outer space.

Regarding the geostationary orbit, Mexico, together with several other Latin American countries, reiterated the specific mandate of the Legal Subcommittee on all aspects of this matter taking into account the

role of the International Telecommunication Union. The need for establishing a special legal system aimed at regulating the use of the geostationary orbit was proposed in order to guarantee equal access for all States, bearing in mind the needs of developing countries, including those of the Equatorial States.

Mexico has been aware of the existing proposals and initiatives on the part of other Latin American countries that may be classified as valid since they aim basically at starting negotiations on the matter and also because these proposals, in the relevant context, include the use of the geostationary orbit in a rational, economic and just manner.

It should be pointed out that Mexico once again stressed the threat posed by space debris and waste brought about by human activities in space and in view of this, it proposed to review the advantages of elaborating an international agreement which could be specifically destined to deal with the matter. Among the number of legal matters to be studied were the definition of space debris and waste, issues of jurisdiction and control and those of liability and responsibility due to damage caused by space debris both in outer space and by its eventual fall to earth.

Lastly, in relation to the "Consideration of the Legal Aspects Related to the Application of the Principle that the Exploration and Utilization of Outer Space should be Carried out for the Benefit and in the Interests of all States, Taking into Particular Account the Needs of Developing Countries," Mexico reiterated the contents of the proposal, made by Brazil and co-sponsored by Mexico which was prompted by the developing countries, and pointed out that the principles contained in the said proposal incorporated different opinions related to the matter and reflected the existence of a clear and convincing mandate on the part of the General Assembly, in order to pursue the formulae that permit the elaboration of international legal norms regarding the application of the matter. Mexico had hoped that the delegations of countries participating in COPUOS would participate in this proposal in the spirit of flexibility and collaboration which motivated the co-sponsors in relation to the said proposed principles.

Dr Miguel Orrico

Professor of Communications and Transportation Law

National University of Mexico

Counsellor of the Mexican Government on Space Matters at COPUOS

Case Notes

*Hughes Communication Galaxy, Inc. v. The United States**

In 1985, Hughes Communications entered into a contract with the United States, represented by NASA. Labeled a Launch Services Agreement (LSA), Article XV of the contract limited NASA's obligation to provide Launch and Associated Services "to the extent consistent with United States' obligations . . . , United States' Law and United States' published policy." Article IV of the LSA addressed NASA's obligation to provide launch services, providing in relevant part, "with respect to launch priority and scheduling, NASA will provide Launch and Associated Services in accordance with the United States policy governing launch assistance approved by the President of the United States on August 6, 1982.

NASA compiled a list of all scheduled payloads to be launched, including Hughes', into a "manifest." The manifest listed commercial payloads in order of their Planned or Firm Launch Dates, and indicated which payloads were to be launched on which shuttle. Hughes' spacecraft were assigned specific slots on this manifest. However, on January 28, 1986, less than two months after Hughes and NASA executed the LSA and before any of Hughes' spacecraft had been launched, the Shuttle Challenger exploded.

As a consequence of the Challenger tragedy and after extensive evaluation of space policy by various governmental entities, the President issued an order on August 15, 1986, in which he announced that NASA would no longer launch commercial spacecraft. In response to this shift in policy, the government grouped the remaining payloads into four categories. Based on these categories and the President's revised policy, NASA announced a new manifest for its shuttle fleet. This manifest included only those payloads which fell into the "Shuttle Unique" (those requiring a manned spacecraft) and "National Security and Foreign Policy" categories. None of Hughes' spacecraft fell within these two categories. Accordingly, Hughes filed suit in the United States Claims Court claiming that NASA breached the LSA.

The Claims Court held that no breach of the LSA occurred, determining that the new manifest, and the exclusion of Hughes' spacecraft, were the result of a valid sovereign act – a policy decision issued by the President with proper authority. The court reasoned that Article XV of the contract incorporated the sovereign act defense by its terms and that the LSA was therefore explicitly made subject to changes in policy. The Claims Court concluded that because the reorganization of the manifest was in

* 998 F.2d 953 (1993). See also *American Satellite Company v. The United States*, 998 F.2d 950 (1993), which involved an agreement essentially identical to the one executed between Hughes Communication, Inc., and NASA. The *American Satellite* holding was consistent with the opinion in *Hughes*.

compliance with the new policy announced by the President, the government did not breach the LSA.

The Court of Appeals reversed, holding that Article IV of the LSA unambiguously required the government to schedule launch services according to "the United States policy governing launch assistance approved by the President of the United States on August 6, 1982."

The Court of Appeals stated that by incorporating an existing, specific and dated item of presidential policy, Article IV is manifestly more specific than Article XV, which subordinates the contract only to unspecified United States obligations, law and published policy. Adhering to the well settled principle that "where specific and general terms in a contract are in conflict, those which relate to a particular matter control over the more general language", the Court of Appeals held that Article IV's specific reference to the policy issued by the President on August 6, 1982 remained controlling "with respect to launch priority and scheduling" as provided in Article IV. Thus, although Article XV of the contract incorporated the sovereign act defense, which provides the United States as contractor will not be held responsible for the acts of the United States as sovereign, it did not control the issue at hand and contributed nothing in aid of interpreting the contract. In the court's view, the government essentially surrendered its authority to act as sovereign "with respect to launch priority and scheduling" as provided by Article IV in "unmistakable terms." Consequently, the Court of Appeals held that NASA, absent the successful assertion of another defense in this case, was to bear the cost of changes in launch priority and scheduling resulting from the revised policy.

Michael A. Gorove*

Florida Coalition for Peace and Justice v. George Herbert Walker Bush⁺

Plaintiffs, a group of environmentalists, sought to enjoin the launch of spacecraft with Nuclear Power Sources (NPS) on board. The first case involved the space shuttle Atlantis, which was to carry the unmanned Galileo spacecraft into Earth's orbit.¹ There it was to be released and arrive at Jupiter in 1995 by using close to 50 pounds of plutonium as an energy source. There have been 22 other space flights by the United States using plutonium; however, none has used as much plutonium as the Galileo mission. The second case pertained to the launch of the space shuttle

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+ This case note is a summary of Prof. Stephen Gorove's presentation "Recent Litigation Involving the Launch of Spacecraft with NPS on Board" on Oct. 20, 1993 during the IAF Congress, in Graz, Austria. It is included here with the permission of the author.

¹ Florida Coalition for Peace and Justice et al., v. George Herbert Walker Bush et al., 1989 U.S. Dist. LEXIS 12003.

Discovery and its payload, the Ulysses spacecraft.² Ulysses was powered by a Radioisotope Thermoelectric Generator (RTG) which converts heat that is generated from the radioactive decay of plutonium dioxide into electricity.

In both cases, the plaintiffs filed a motion for a Temporary Restraining Order ("TRO"). In this connection, the Court stated that to justify the grant of a TRO the plaintiffs had to show: likelihood of success on the merits, irreparable harm in the absence of the TRO, no substantial adverse impact on other parties, and that the TRO would serve the public interest.

As to the merits, plaintiffs' legal basis for seeking an injunction was that NASA had failed to satisfy the requirements of the National Environmental Policy Act ("NEPA"). Specifically, plaintiffs advanced two major complaints, namely, that (1) the Environmental Impact Statement ("EIS") did not assess all relevant risks and underestimated their magnitude, and (2) it did not fully consider alternatives to the proposed plan, such as the launching of unmanned rockets or the use of other power sources.

(1) Risk Assessment

The plaintiffs claimed that the Galileo mission was a hazard to the environment because the plutonium it used as a power source caused an increased risk of cancer in humans if inhaled or ingested. They argued that the risks of an accidental release of plutonium fuel into the environment at various stages during the mission was too high, and contended that NASA failed to meet the requirements of the National Environmental Policy Act ("NEPA"), which mandates that federal agencies must evaluate and report "major federal actions significantly affecting the quality of the human environment" in an Environmental Impact Statement ("EIS").

In addressing the complaints and issues raised, the Court found that the missions had been extensively reviewed by various government agencies to determine the likely environmental consequences. The result of this review was a final environmental impact statement (Tier 1) for the Galileo and Ulysses missions in November 1988 and a final environmental impact statement (Tier 2) for the Ulysses in June 1990. These statements concluded that the risks of cancer fatalities from an accident were extremely low. The reports estimated that the worst case accident scenario would result in only a 1-in-44-million chance of 14.5 excess cancer fatalities over a 50-year period. The reliability estimates for the shuttle ranged from 97 to 99 percent. Although the plaintiffs contended that the estimates were based on incomplete data and outmoded techniques, and, in reality, the risks were substantially higher, the Court stated that it would

² Florida Coalition for Peace and Justice et al., v. George Herbert Walker Bush et al., 1990 U.S. Dist. LEXIS 13345.

not second guess the judgments of the agency's experts unless they were clearly arbitrary and capricious. As the plaintiffs failed to provide sufficient evidence of arbitrary or capricious agency action, the Court concluded that the plaintiffs were unlikely to succeed on the merits.

(2) Alternatives

As to alternatives, NEPA mandates that to be adequate, an EIS must examine alternatives to the proposal being examined. According to the plaintiffs, there were three significant alternatives that were left out of the EIS: (a) the option of delaying the Galileo and Ulysses launches until the 1991 windows; (b) the use of a Titan IV launch vehicle instead of the space shuttle; and (c) the use of alternative power sources. In reviewing these complaints, the Court found that all three alternatives were addressed in the relevant EIS's.

(a) Delay of Launch: Insofar as the delay alternative was concerned, that is, the option of postponing the launch until the 1991 launch opportunity, the plaintiffs contended that such a delay would allow NASA to gather further information, to refine its analyses of the risks involved with this program, and to finalize emergency response and evacuation plans. However, the EIS stated that since the environmental effects of a delayed launch would largely be the same as those of a launch in the planned window, the delay alternative was eliminated from consideration.

In connection with the above, the court noted that NASA conducted several studies on the launch of payloads containing nuclear materials, and included these studies as part of the final environmental impact statement. While NASA's knowledge of the risks involved and the possible ways to mitigate the environmental impact of the mission might improve in two more years, this would probably always be true with any agency action set to begin at a specified time. Under NEPA, an agency is not required to have complete information in order to proceed with a project. Instead, an agency is only required to adequately assess the information that is available. Since the plaintiffs were simply pointing to some areas where more information might be learned by a short delay period, instead of presenting sufficient evidence to indicate that the delay alternative deserved more serious consideration, the Court concluded that the plaintiffs were unlikely to succeed on the merits.

(b) Use of Titan IV: With respect to the use of the unmanned Titan IV rocket instead of a space shuttle, plaintiffs contended that the likelihood of a release of plutonium from an accident at launch was less with an unmanned vehicle because the plutonium would be stored further away from the area which was most likely to explode. However, the Court found that the use of Titan IV was not a feasible alternative since a minimum of three years were required to modify the basic Titan IV to make it mission-specific.

(c) Use of Other Power Sources and Alternatives: As to plaintiffs' claim that the EIS failed to consider the use of alternative power sources, the Court found that these alternatives were discussed in the Galileo EIS

and ruled out because they did not meet the six performance criteria of the mission. At that time, there was no known alternative power source which was feasible for the mission. For the same reason NASA chose RTG as the power source because it was the only power source that met the performance requirements for the Ulysses mission. In view of these considerations, the Court concluded that neither one of these arguments was likely to succeed on the merits.

With respect to plaintiffs' reservations about the EIS for failing to address other alternatives, the Court noted that common sense teaches us that a detailed statement of alternatives cannot be found wanting simply because the agency failed to include every alternative device thought conceivable by the mind of man. Time and resources were simply too limited to hold that an impact statement was inadequate because the agency failed to ferret out every possible alternative.

Conclusion

In the overall assessment of the two cases, it was the Court's view that NASA's decision, founded on a reasoned evaluation of the relevant factors, had met all the necessary requirements of NEPA. Thus, none of the plaintiffs' challenges were likely to succeed on the merits, and their motions for a TRO were accordingly denied in both cases.

The two cases were decided prior to the adoption of U.N. resolution on Principles Relevant to the Use of Nuclear Power Sources in Outer Space and had no foreign involvement. Nonetheless, their analysis is instructive in that it may provide the necessary background for policy makers in their comparative evaluation of the development and judicial application of national environmental law involving the launch of spacecraft with NPS on board and the safety assessment and safe use guidelines of the somewhat later adopted U.N. principles.

*Michael A. Gorove**

Short Accounts

The Second ECSL Summer Course on Space Law and Policy, Toulouse, September 6-18, 1993

Space programs, space interests and actors, and space policy have gone through substantial changes in the past years. The interest in the related legal issues has been developing in parallel with these evolutions, in particular with changes in Europe. The European Centre for Space Law³

* Boston University School of Law

³ The European Centre for Space Law (ECSL) was established in 1989, at the initiative and under the auspices of the European Space Agency, with the support of a number of authorities in this field. The main objective of ECSL is to contribute to the development and improvement in Europe of the knowledge of the law of space

followed these trends and witnessed the emergence of a very strong interest of students in this field of law, as well as in space policy. The efforts undertaken in European universities to develop courses and seminars on space law have been very successful in stimulating the interest of students and, little by little, that of a number of professors. The European Centre for Space Law understood the need for a specific course and responded to this growing interest. This is how the ECSL Summer Course on Space Law and Policy was initiated. The course is organized within the framework of the European Community ERASMUS program and is set up jointly with the host university and the European Centre for Space Law. The first course was organized in Messina in 1992 and the 1993 Course took place in Toulouse. Twelve European universities participated in the Toulouse Summer Course.⁴ Each university sent three students and one professor. The course was supported by the University of Toulouse, ERASMUS, the European Space Agency, the British National Space Centre, and the European Centre for Space Law. Martinus Nijhoff supported, jointly with

activities through three means: exchange of information among groups active in this area of space activities; improvement and promotion of teaching; organization of means allowing groups active in the law of space activities to communicate and exchange views. Another objective of ECSL is to promote, outside Europe, European activities and to contribute to building a unique position for Europe in the field of space law practices, teaching and publications. ECSL currently constitutes a group of 450 persons. The number of activities is now considerable. The most important achievement with respect to contacts among practitioners is the organization of a Practitioners' Forum once a year. This meeting is intended to give practitioners, once a year during a one-day session, an opportunity to meet expert lawyers practicing in the field of space activities, who will provide them with an update of their knowledge and information in this area. With respect to academics, the most important activity in this respect - which is also the most successful - is the ECSL Summer Course on Space Law and Policy. ECSL also organizes, jointly with IISL, the Space Law Moot Court Competition. The 1993 final competition, which took place in Graz during the IISL Conference, was won by the Dutch team, supported by ECSL. ECSL is also a centre where researchers are initiated, according to subjects chosen by its members and its Board. The first research carried out by the centre concerned the legal protection of remote-sensing data. Workshops and conferences have been organized on this subject. Solutions have been identified and ECSL, jointly with ESA, has undertaken discussions with the European Commission and exchanges with the European Parliament to study the means to take into account the suggestions resulting from this study. The second research initiated by ECSL concerns intellectual property rights in outer space, which is currently being continued with other concerned institutions. Finally, ECSL supports research done by students, either helping them gather materials, or promoting their works. In this view, ECSL transformed its bursary program into a publication prize which will be awarded to exceptional works, according to terms which have to be further organized. ECSL has set up, with the support of the European Space Agency, a space law database called ESALEX which contains basic texts of space law, ESA basic texts, statutes of other international organizations in full text, bibliographical files of the University of Cologne and of the ESA Library. ECSL publishes a newsletter, ECSL News, read by some 2000 persons worldwide, and especially by ECSL Members, as well as books or booklets, proceedings...).

⁴ Aberdeen, Amsterdam, Cologne, Granada, Leiden, Louvain, Messina, Padua, Paris I, Rome, Siena, Toulouse, Utrecht.

ECSL, the publication of the book ECSL Space Law and Policy Summer Course, Basic Materials. Arianespace, Spot Image and Matra Marconi offered presentations and visits to the students.

The main frame of the course is composed of lectures on two series of topics. The first part is devoted to global issues of space law and space organizations: United Nations institutional functioning, resolutions of the United Nations General Assembly of 1961 and 1963, Outer Space Treaty, Registration Convention, Rescue Agreement, Liability Convention, Moon Agreement and common heritage of mankind principle, United Nations Principles on Remote Sensing, Space Debris, Nuclear Power Sources, ITU and use of the geostationary orbit, Intelsat, Inmarsat, Eutelsat, Eumetsat, Arabsat, Palapa, Intersputnik, European Space Agency, Involvement of the European Community in space and EC Communications. The second part of the course deals with legal issues related to space applications: introduction to commercialization of space activities, liability issues and settlement of disputes, national space agencies and programs, space station, Ariane and launching law, remote sensing and ESA data policy, legal protection of remote sensing data, inventions in outer space and intellectual property rights, US domestic laws and the example of launching services, space shuttle and aerospace plane.⁵ Besides the basic lectures, in a third part of the course, an effort has been made to invite practitioners to give guest lectures to the students on the following topics: Relations of ESA with the EC and with Eastern Europe; New trends in the field of telecommunications services from the point of view of users and service providers; Ariane production contracts; competition in launch services; space activities and protection of the Earth Environment; Comparative overview of space law and the law of the sea; peaceful uses of outer space.⁶ Finally, the fourth part of the course consists in individual and team work, with the guidance of tutors and with training on the legal database ESALEX.

After two summer courses, the first assessment is very positive. It is now recognized that the summer course contributes to the teaching of space law in Europe and meets the need of students for a broad introduction to the law of space activities, since most teaching is provided at a much higher level in European universities. The teaching is of very

⁵ Professors and lecturers who presented the main program: Professor de Faraminan, Professor Zanghi, Professor Back Impallomeni, Professor Peyrefitte, Professor Reijnen, Professor Lyall, Mr. Thiebaut (ESA), Mr. Tuinder (Consultant), Mrs. Cheli (ESA), Professor Böckstiegel, Professor Malanczuk, Mr. Bourély, Mr. Farand (ESA), Professor Wassenbergh, Mr. Ferrazzani (ESA), Professor Gaudrat, Mrs. Balsano (ESA), Mr. Lopez-Aguilar (Centro Espanol de Derecho Espacial), Professor Courteix, Professor Martin.

⁶ Guest lecturers: Mrs. Cheli (ESA), Professor Rapp (Ferry & Associés, Paris), Mr. Jeannot (Arianespace), Mr. Larcher (Arianespace), Mr. Lopez-Aguilar (CEDE), Professor Kerrest de Rozavel, Professor Detter de Lupis Frankopan, Mr. Dufrene (Spot Image), Mr. Turk (Matra Marconi Space), Mr. Cardin (Matra Marconi Space). Students went to Spot Image for the guest lectures and a visit of Matra Marconi Space was organized for them.

high quality thanks to the network of contacts of ECSL as well as of the number of outstanding professors and lecturers in Europe. Improvements still have to be made, a second volume of Basic Materials will be published..., and, in general, the outcome of those two summer courses is a success. The next summer course is now being prepared. It will take place in Granada from September 5 to September 17. Guest lectures will also be organized, as well as visits of space industries, during a three day stay in Madrid just prior the course. The basic program will remain the same, but special attention will be given to update the curriculum on new issues and new trends, especially in times of dramatic changes as those we are going through now.⁷

Valérie Kayser
ECSL Secretary

Important Developments In Space Policy And Law

In the interests of bringing together space law practitioners, policy makers and writers for a morning of information exchange and debate on space law and policy, the Federal Bar Association ("FBA") International and Transportation Sections organized this half-day Seminar, which was held in Washington, D.C. on September 14, 1993. The Washington Space Business Roundtable co-sponsored the event. Speakers included Clinton Administration officials responsible for shaping space policy, and senior executives and lawyers from key space business companies. The focus was on the business aspects of space, and how this is impacted by space law and policy on a very practical level.

After brief introductions by the undersigned Program Co-Chairs, *Pamela Meredith*, (President of the consulting group, Space Conform, Inc.) and *Rachel Trinder* (Partner in the Washington, D.C. law firm of Zuckert, Scutt & Rasenberger), who together serve as Co-Chairs of the FBA International Section Space Law Committee, the program was given a rousing start by *Douglas Heydon*, President of Arianespace, Inc., the U.S. subsidiary of Arianespace, which has overall responsibility for marketing Ariane launch services in the U.S. Mr. Heydon provided a controversial introduction for the first panel, of which he was the Moderator, on "U.S. Launch Policy At A Crossroads: The Current Debate", by noting that there appears to be a lack of space policy leadership in the United States. He asked whether the current launch policy approach is the right one for the United States, and remarked that Europe, which began investing in new launch system development some twenty (20) years ago, appears to be

⁷ More information on the European Centre for Space Law may be obtained from ECSL Secretariat, 8-10 rue Mario Nikis, 75738 PARIS CEDEX, phone 33.1.42.73.76.05, fax: 33.1.42.73.75.60.

* The papers from the Conference, held in July 1993, have been published in its proceedings, SD-01, Paris, France.*

reaping the rewards of its foresight. This opening set the stage for a lively and spirited debate.

With the introduction as the backdrop, *Gerald Musarra*, now Washington Counsel and Director of the Space Systems Division of Lockheed Missiles and Space Company (and previously with the National Space Council), spoke on the subject of the "Background For The Launch Policy Debate", providing an informative outline of the development of U.S. launch policy over the last two (2) decades, and suggesting that U.S. policy is in as much disarray now as it was eight (8) years ago immediately following the Challenger accident.

Terry Dawson, Engineering Advisor to the Subcommittee on Space of the House Science, Space & Technology Committee, began his remarks, which next followed, by noting that the one thing that's clear about current United States space policy is that nothing is clear. He proceeded to give Seminar participants an extremely useful and insightful summary of current Congressional policy and trends in his presentation on "Recent Congressional Hearings On Launch Policy". The panel continued with a most interesting and informative presentation by *William English*, General Counsel of Iridium, Inc., in which Mr. English placed U.S. launch policy in an international context. *Rex Hollis*, Vice President of Policy and Planning at Space Systems/Loral, in his discussion of U.S. launch policy, then offered the perspective of the launch services customer who, he said, should have the option of choosing among U.S. and several foreign launch providers. *John Dugan*, who is Vice President of Congressional Affairs at General Dynamics Space Systems Division, offered the perspective of a launch services provider. *Michael Henshaw*, Vice President of Business Development at Martin Marietta, gave suggestions for a balanced approach to U.S. launch policy, and appropriately so, he said, since his company is now both a provider and user of launch services.

After a short break, *Jennifer Smolker* of Hughes Space and Communications Company, acted as Moderator of the morning's second panel, which was entitled "Post-Cold War Changes In Space Policy And Law". An overview of the issues was first given by *Dr. Marcia Smith* of the Congressional Research Service's Science Policy Research Division, who spoke about the "Impact of the New World Political Climate On Space Activities". Thereafter, the group was especially fortunate to listen to *Dr. Peter Allgeier*, Assistant Trade Representative for Europe and the Mediterranean, who spoke on the subject of the recently concluded space-related trade agreement with Russia. Dr. Allgeier negotiated the agreement on behalf of the United States, and was able to provide considerable insight not only into the agreement itself, but also likely future ramifications.

The morning continued with a presentation by the newly appointed Director of the Department of Commerce's Office of Space Commerce, *Keith Calhoun-Senghor*, who gave invaluable information regarding both his plans for the Office, and his views on "Space Commerce and Trade In The Post-Cold War Era". The second panel concluded with a discussion by *Dr. Kenneth Peoples*, Licensing Officer in the State Department's Office of Defense Controls, regarding "Changes In Regulations Concerning Export Of

Commercial Satellites". Dr. Peoples' presentation was of particular interest in the light of the release in the week prior to the Seminar of two Final Rules affecting commercial space, namely (1) Revisions to the Commerce Control List made by the Department of Commerce's Bureau of Export Administration affecting commercial communications satellites, issued on September 8, 1993 (58 Fed. Reg. 47322), and (2) Amendments to the International Traffic in Arms Regulations issued on September 10, 1993 by the Department of State's Bureau of Political Affairs (58 Fed. Reg. 47636). The rules are designed to reduce the burden on communications satellite exporters by making various changes in the Commerce Control List and the U.S. Munitions List.

The Seminar concluded with an outstanding speech by Congressman *Robert Walker* (R.Pa.), who counts among his responsibilities the posts of Chief Deputy Republican Whip, Republican Chairman (Ranking Minority Member) of the House Committee on Science, Space, and Technology, and Member of the Joint Committee on the Organization of Congress. Despite an extremely demanding schedule that day, Congressman Walker took the time both to deliver a thorough and perceptive view of the Congressional space agenda in the months ahead, and to answer many questions by the Seminar participants. The group was most appreciative of the opportunity to meet with the Congressman in a setting which allowed for considerable interaction. Indeed, the entire morning was characterized by a great deal of interplay between the speakers and audience. The group was particularly pleased to welcome among its participants *Mr. Frank Weaver*, the newly appointed Director of the Department of Transportation's Office of Commercial Space Transportation, who was duly congratulated on his appointment.

Rachel B. Trinder

Pamela L. Meredith

Co-Chairs, Developments in Space Policy and Law

Organizing Space Activities in Developing Countries: Resources and Mechanisms

From October 15-17, 1993, prior to the 44th International Astronautical Federation (IAF) Congress, a Workshop was held in Graz, Austria on "Organizing Space Activities in Developing Countries: Resources and Mechanisms." It was jointly organized by the United Nations (UN Office for Outer Space Affairs) in cooperation with the International Astronautical Federation (IAF), co-sponsored by the European Space Agency (ESA), the Commission of the European Communities (CEC), and hosted by the Austrian Space Agency (ASA) on behalf of the Government of Austria. Honorary chairmen of the Workshop were *H. E. Dr. P. Hohenfellner* (Chairman of UN/COPUOS), *H. E. Dr. P. Jankowitsch* (Former Chairman of UN/COPUOS) and *Prof. W. Riedler* (Technical University of Graz). The Programme Committee, with *J. Arets* (ESA), *S. Camacho* (UN/OOSA), *MG. Chandrasekhar* (IAF), *M. Gerard* (AIAA), *A. Ghazi* (CBC) and *J. Hess* (AIAA/IAF), as members, was co-chaired by *N. Jasentuliyana*

(Director, UN Office for Outer Space Affairs), J. Ortner (ASA) and U. R. Rao (IAF/CLTODN).

The Workshop is to be seen on the background of the UN Programme on Space Applications which has convened a number of regional and international workshops on different aspects of space science and technology. The recommendations made at these workshops concerning the establishment of space related infrastructure and the training for specialists in developing countries were examined at the 1991 UN/IAF/Canada Workshop on Space Technology and Development and the UN/IAF/COSPAR/AIAA Symposium "Space Technology in Developing Countries - Making it Happen," held in Washington in 1992.

As a follow-up to these activities, the purpose of the Workshop was to bring together high level representatives from government and the space industry from both industrialized and developing countries to address institutional and commercial aspects of space research, development and application through which developing countries can initiate or improve their own space related activities. The immediate objective of the Workshop was to review the recommendations of the earlier workshops by focusing on the two major fields of (i) Environment and Resources Management and (ii) Space Communications for Development. The aim was to "provide a general blue-print on how developing countries, either on their own or on the basis of cooperative ventures, can establish cost effective industrial or institutional enterprises in adequately selected areas of space science and technology."

During the three-day conference there were more than 30 keynote and theme presentations, including interesting case studies of successful efforts in developing countries, which concentrated on the most relevant issues in which space technology could make a significant contribution to economic and social development in the two selected main areas of study. It is not possible to list the contributions; however, the papers will be published in 1994 by the United Nations.

The summary of conclusions and recommendations of the Workshop, addressed to international and national decision-makers, has a general part and then concentrates on telecommunications and earth observation.

Among the general recommendations, is the suggestion that all countries nominate an agency or other organization as a focal point for all space-related matters to build and maintain regular contacts with potential domestic users of space services. Such national focal points should establish mission goals to analyze and define problems to which space techniques could help provide solutions. Furthermore, with reference to the Asia-Pacific Multilateral Cooperation in Space Technology and Applications (MCSTAD), increased cooperation between the developing countries themselves is encouraged. The general recommendations also stress the role of the United Nations in stimulating space cooperation with developing countries. An example given is providing consultancies "which give impartial expert advice for resolving problems with due consideration to local conditions; coordination in natural disaster prediction and relief; and in helping to rationalize the creation and up-grading of ground

stations for the reception of satellite data, to ensure maximum coverage and access." Finally, they address the need to convince decision-makers in developing countries of the practical benefits of the use of space technology

The recommendations on telecommunications commence with the proposal to introduce satellite communication at least at university graduate level in developing countries. Satcom operators, such as INTELSAT and INMARSAT, should provide satcom capacity to foster development of services, including TV programmes for interactive educational programmes, data relay, fax transmissions and video communications using VSATs. Apart from asking for space capacity from satcoms to be made available to developing countries for experimental and pre-operational purposes, the recommendations further emphasize the procurement of simple inexpensive hardware with fractional transponder capacity to provide first experience with services in developing countries for later up-grading. Another aspect mentioned is the standardization of equipment which some developing countries have been able to manufacture, such as TVROs and VSATs. The last point deals with the responsibility of developed countries to consider the needs of developing countries with regard to the allocation of frequency bands and orbital slots and to the development of new technologies enabling frequency utilization reduction and avoidance of interference between satellites in the geostationary orbit.

As to earth observation, the recommendations note that there has been significant improvement over the last five years in the capacity of developing countries to use earth observation space data, although coordinating mechanisms could still be improved at relatively low cost. While there is no general shortage of satellite data, possible users and decision-makers are not always aware of the potential and of means of access to the data. Satellite data, therefore, should be made available at affordable cost and in a timely manner to all, "unhindered by unnecessary bureaucratic complications and free of external influences." End users in developing countries should not be described in "space" terms (orbit, type of sensor, etc.) but primarily in terms of the service, measurement, etc. required on the ground (in terms of the end-user's problems). Developing countries should have an input in the ongoing discussion with space agencies within the framework of CEOS. In this connection, the question is raised whether the existing CEOS structure can be modified to allow for adequate representation to end-users or whether a new international user forum is needed. Moreover, the development of own satellite competence in a number of developing countries should lead to activities which are directly relevant to problems in their own country and other countries with similar problems, thus complementing the existing earth observation space programmes. Space agencies should make space data available to developing countries in the most user-friendly form. Educational curricula should systematically include remote sensing techniques, primarily with a view to make professionals other than space specialists and the public more aware of the potentials and limits of space activities. The section concludes with the recommendation that remote sensing institutes should

avoid isolation and seek cooperation and co-location with institutes for agriculture, fishing, geology, etc.

Prof. Dr. Peter Malanczuk
University of Amsterdam

Space Debris Issues

The 15th Scientific-Legal Roundtable was held on October 20, 1993 on the subject of Scientific and Legal Aspects of Space Debris. The first paper presented by W. Flury ESA/ESOC, Darmstadt, Germany, dealt with "Space Debris - A Status Report, Summary of the First European Conference on Space Debris."* Flury summarized the main conclusions of that conference, which included the following: 1. The long-term debris hazard in the LEO and GSO is of the most concern; 2. Significant efforts are being made to characterize and improve the knowledge of the made-size debris population (1-50 cm size); 3. The shielding is effective for protecting particles up to 1 cm size but not for those larger; 4. Cleaning up debris is neither practical nor economically feasible, therefore preventive measures are being used; 5. Some of the identified preventive measures which could be implemented include destructive reentry into the atmosphere to burn up the space vehicle or selection orbital parameters to limit the lifetime; 6. It should be ensured that residual propellant is removed as far away from the GSO as GSO satellites are moved.

D. McKnight, Karman Sciences Corp., USA, gave a paper on "Summary of the IAA Position Paper on Orbital Debris: Recent Events and Observations." The IAA paper was released in October 1993 as an IAA approved position paper. The position paper concluded with 7 recommended actions: 1. No deliberate break-ups of spacecraft which produce debris in long-lived orbits; 2. minimization of mission-related debris; safing procedures for all rocket bodies and spacecraft which remain in orbit after completion of their mission; 4. selection of transfer orbit parameters. to ensure the rapid decay of transfer stages; 5. re-orbiting of GSO satellites at end of life; 6. separated ABMs used for GSO should be disposed where the GSO satellites are disposed, at least 300 km above the GSO; .7. upper stages used to move GSO satellites from to GTO to GEO should be disposed of similarly.

Dr. Carl Q. Christol, Univ. Southern California, USA, in his paper on "Scientific and Legal Aspects of Space Debris" stressed the mobilization of political will in order for the debris problems to be attacked. He suggested that policy makers would have to support an international legal regime which has as its principal purpose the minimization of the presence of man-made space debris. In addition, he noted that a number of specific legal requirements will have to be adopted, e.g. a definition of debris, that launching states have first and principal responsibility for the prevention of debris and for correcting it, and absolute liability in all cases.

The paper of *Professor Pierre Martin*, Toulouse University, France addressed "Liability Issues on Space Debris, The Opinion of a Teacher in International Law." Much like Professor Christol, Professor Martin supported the idea of absolute liability in outer space. Nevertheless, he believed that customary international law can provide a legal basis for fault in the meantime. For example, he noted the presence of sending GSO satellites to a higher orbit when their useful life is over. A failure to do so could result in fault and perhaps liability.

Professor Vladimir Kopal, Charles University, Czech Republic, discussed the "Legal Issues Relating to Space Debris as Reflected in an Inquiry Undertaken by the IAA/IISL Scientific Legal Liaison Committee. He reported on the various interesting responses received from the IAA/IISL members of the Liaison Committee who had responded to questions pertaining to space debris., i.e. definition of debris, should debris be returned to the launching state, can anyone remove a non-functional object, etc.

Dr. R.A. Williamson, Office of Technology Assessment and *R. Obermann*, Space Subcommittee, House of Representatives, USA, spoke on "Addressing the Orbital Debris Problem: The US Congress and the International Policy Challenge."

In some other sessions the debris problem was also addressed. For example, *Dr. R.C. Reynolds*, Lockheed, and *Dr. J. P. Loftus*, NASA, presented a paper on "A Handbook to Support the NASA Policy to Limit Orbital Debris." *Dr. L. Perek*, Academy of Sciences, Czech Republic, addressed the "Management of Outer Space." In his paper, he argues that it will be necessary to regulate the traffic of active spacecraft. He also advocates the adoption of international requirements as to the competency of crews and technical equipment of spacecraft. He suggests that monitoring of location and motions of space objects should receive international attention and be assessable through a computer network. *Dr. Masahiro* and *Dr. Hiroshi Yoshida*, CSP, Japan, reviewed the results of a study done on the "Social Impact of Space Debris" under the auspices of the Space Debris Study Group, a Social Impact Study Group within the Japan Society for Aeronautical and Space Sciences. The paper focused on two of the results of the study group: cost estimates for debris mitigation techniques and possible framework for international discussion on the debris issues. With respect to the latter, the group concluded that in terms of an organizational framework for international cooperation on debris, the most realistic method would be to create a sub-organization within an existing organization. In terms of a mechanism for cooperation, they concluded that perhaps the establishment of a consortium in which both government and private firms are involved would be advantageous. *Dr. Carl Maag*, T M Engineering, USA, *Dr. Diane Martin*, Colorado School of Mines, USA, *Dr. Reginald Smith*, RCS Associates, USA and *Dr. Timothy Stevenson*, Mare Crisium, UK, jointly prepared a paper on "Policies for Dealing with the Operational Aspects of Space Debris Generation." Although their paper contains a number of interesting proposals, the most captivating are some of their proposed legal changes, including, e.g.: 1. space debris means

"Those man-made objects in outer space deemed to be valueless, as evidenced by an absence of operational control, and includes inactive payloads, operational debris, fragmentation debris and microparticulate matter," 2. removal of space debris without the consent of the State of registration, 3. all states are responsible for the space debris they create and shall provide compensation for damage caused by space debris.

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Congressional Notes

During its deliberations of authorizing appropriations for NASA, Congress had under consideration a number of important legal and policy issues. Among them were the policy determination that NASA's unique competence in scientific and engineering systems should be directed toward supporting the private sector development of advanced space technologies since they enhance economic growth, competitiveness, and productivity. Congress was also interested in seeing NASA conduct a comparative analysis of U.S. and foreign expendable space launch systems and determine specific differences in their design, manufacture, processing, overall management and infrastructure with a view to assess the approximate effect of these differences on the relative cost, reliability, and operational efficiency of such systems. Among other items considered by Congress were requirements for the inclusion in the contract of specific liability provisions for the contractor's failure to comply with the stipulations of all cost-type research and developments contracts entered into by NASA for the acquisition of articles or services. With respect to the National Aero-Space Plane Congress found that hypersonic flight will be critical to the continued contribution of aeronautics to the economic and strategic interests of the United States in the early twenty-first century and that a single-stage hypersonic research plane is critical to the successful exploration of a hypersonic flight regime and the timely realization of a single-stage-to-orbit, air-breathing plane.*

International Developments

A 300-page agreement involving Russia's participation in the international space station project was signed by Vice-President Gore on December 16, 1993 during his recent visit to Russia. Under the agreement, the United States will pay Russia \$400 million for the privilege of allowing astronauts to fly on the Russian Mir space station while a Russian cosmonaut will fly on a U.S. space shuttle in February 1994 without charge. The agreement commits the United States and Russia to the assembly of a new international space station by late 2001. Without

*

See 103 P.L. 124; H.R. 2491 (1993); 107 Stat. 1275.

the agreement, NASA and its partners in Europe, Japan and Canada were not expected to complete their proposed outpost before 2003.

Building the new station will require 31 rocket launches starting in 1997, 19 of them using the space shuttles to be launched from the Kennedy Space Center and a dozen of them using the Russian Soyuz, Proton and Zenit rockets to be launched from the Baikonour Cosmodrome in Kazakhstan. Under the agreement, astronauts and cosmonauts will attempt to extend the operating life of the 8-year-old Mir by equipping it with new electrical power-generating solar arrays and, possibly, two Russian science modules using U.S. laboratory instruments.

Reversing an eight-year-old Republican policy that permitted development of a space-based defense against a nuclear missile attack, the Clinton Administration has endorsed the "narrow or traditional" interpretation of the 1972 U.S.-Soviet Anti-Ballistic Missile Treaty which prohibits the development, testing, and deployment of sea-based, air-based, space-based, and mobile land-based ABM systems and components without regard to the technology utilized.

Based on a 1992 amendment to the 1987 Montreal Protocol, there is now an agreement under which countries will completely phase out the production of chlorofluorocarbons, and most other ozone-depleting substances by the end of 1996. President Clinton announced that the US will reach the phase-out target by the end of 1994.

The first meeting of the ITU's Telecommunications Development Advisory Board was held July 6-7, 1993 with the aim of advising ITU on priorities and strategies for telecommunications development.

ITU's novel regime of biennial World Radiocommunications Conferences (WRC) and Radiocommunication Assemblies (RA), inaugurated in November 1993, at Geneva, is expected to review and simplify the international Radio Regulations and facilitate the use of frequency bands allocated to the mobile-satellite service.

In November 1992 NASA and the National Space Development Agency of Japan (NASDA) signed a National Level Exchange Agreement providing the aerospace communities in each country with a central point of information exchange.

The Great Wall Industry Corporation of China has signed an agreement with Iridium to launch at least six of their LEO communications satellites, in return for a 5% stake in the company.

Japan and ESA signed an agreement on June 3, 1993 in Tokyo on optical space communications. Exchanges of views aimed at agreement on long-term space development policy are expected to continue in Paris in the Spring of 1994.

Manfred Lachs Space Law Moot Court Competition

The finals of the 1993 Manfred Lachs Space Law Moot Court Competition were held on Oct. 21, 1993 in Graz between the teams of the University of Leiden, winner of the European, and George Washington University, winner of the American preliminaries and were won by the University of Leiden.

The case for the 1994 Space Law Moot Court Competition deals with an international space station, intellectual property rights and liability for damage. Preliminary rounds of the competition will be held in the U.S. and Europe and the finals October 9-14, 1994, at the Hebrew University in Jerusalem during the Congress of the International Astronautical Federation.

Other Events

"The Case for Mars V" conference convened at the University of Colorado, Boulder, May 26-29, 1993.

The United Nations Institute for Disarmament Research (UNIDIR), headquartered in Geneva, organized a one-week workshop in September 1993 on "High Technology Ground-to-Space Tracking: Political, Technical and Economic Aspects" at the Algonquin Space Complex operated by the Institute for Space and Terrestrial Science in Canada. The multinational and multidisciplinary workshop examined the feasibility of a number of international confidence-building measures and explored the increasingly critical problem of space debris. A second workshop is planned for the spring of 1994 in Europe with final publication tentatively scheduled for the third quarter of 1994.

The Second Annual SpaceTalk Conference was held on September 16-17, 1993 at Utah State University.

The 15th Annual Satellite Communications Users Conference took place October 5-7, 1993 at San Jose, California.

Mining, Resource Utilization and Space Exploration were the topics of a conference held November 2-4, 1993 in Louisville, Kentucky.

The Fifth Annual Conference on the Law and Outer Space: Doing Business in Satellite Communications, took place November 5-6, 1993 at Georgetown University Law Center.

The European Forum on Space Transportation Systems, held November 25-26, 1993 in Nancy, France had a panel discussion on International Cooperation and/or Competition.

Brief News

Scientists found first evidence that invisible dark matter that makes up much of the universe exists at edges of galaxies.

The biggest repair effort in space history, demonstrating that astronauts can perform complex and sensitive technical procedures in space, was accomplished by the seven-member crew of the Space Shuttle Endeavour on its December 1993 mission during which astronauts in the course of a record-setting five space walks refurbished the \$1.6 billion Hubble Space Telescope, installing 11 new parts of optics and guidance systems and new solar-power panels. Whether Hubble's flawed view of the universe has been fully corrected will not be known until after two months of tests...Earlier Endeavour experiments with frogs showed that

eggs can be fertilized in the absence of gravity....The Endeavour expects to make its 6th trip into space in April 1994 carrying the Space Radar Laboratory to be used for making maps, interpreting geological features and conducting resource studies.

The Galileo spacecraft released from the shuttle on October 18, 1989 encountered its second asteroid, Ida, on August 28, 1993 and is expected to arrive at Jupiter on December 7, 1995.

The United States plans to launch in 1996 the first spacecraft to orbit around an asteroid and study its characteristics. The asteroid Eros will be about 230 miles from the Earth at the time of the planned rendezvous in late 1998.

Contacts with the \$1 billion Mars Observer spacecraft were lost....After an apparently successful launch, the \$220-million Landsat 6 Earth observation satellite, carried aboard a Titan H6 rocket went into the wrong orbit and vanished over the Pacific.... A Titan IV rocket carrying a sophisticated spy-in-the-sky satellite exploded shortly after take off on August 3, 1993.

Thiokol Corp., a manufacturer of the booster rocket for NASA's space shuttle, is converting for its use the Yellow Creek Advanced Solid Rocket Motor plant, funds for which were killed earlier by Congress after spending \$2 billion on the project.

NASA's Scientific and Technical Information (STI) Database postings have reached 20 million.

Comsat, using its earth station in Kuantan, Malaysia, is to provide digital Inmarsat-B telecommunications services worldwide for large vessels and land mobile users and Inmarsat-M services for smaller vessels and portable briefcase terminals.

The Ariane-5 solid propellant booster was successfully tested on June 25, 1993 in French Guiana.

India's attempt to launch its Polar Satellite failed.

Bahrein has joined INTELSAT and designated the Bahrein Telecommunications Company (BATELCO) as the Signatory. Slovakia and Georgia have also joined INMARSAT, bringing its membership to 69.

South Korea expects to launch Koreasat, a communications satellite in 1995.

B. Forthcoming Events

Asian Aerospace '94 will be held February 22-27, 1994 in Singapore.

The first World Telecommunication Development Conference will be held March 21-29, 1994 in Buenos Aires

The Fifth Annual Symposium of the University of Arizona Space Engineering Research Center to be held in Tucson, March 24-25, 1994 will focus on "Dual Use of NASA Space Processing Technologies."

The Space Law Interest Group of the American Society of International Law will hold a Panel discussion April 7, 1994 at the ANA Hotel in Washington D.C. on "Vexing Issues of Supreme Authority and

Sovereign Rights Arising out of Space Activities." Under the Chairmanship of Prof. Stephen Gorove, the panel is scheduled to include Paul G. Dembling, as Moderator, Gerard Musara and Daniel F. Byrnes, as Panelists, and Paul B. Larsen, as a Commentator.

The IAA International Conference on Low-Cost Planetary Missions will take place in Maryland, April 12-15, 1994.

Egypt will host Africa Telecom '94 April 25-29, 1994 in Cairo.

Topics to be discussed at the Global Air & Space '94 conference to be held May 3-5, 1994 in Washington D.C. include International Competition and Cooperation, Government Regulations and Policy, Technology Transfer, Environmental Concerns, Space Exploration, and Satellite Communications.

As reported previously, the 1994 Colloquium on the Law of Outer Space is expected to take place October 9-14 1994 in Jerusalem, Israel. Topics to be discussed include: (1) New Legal Developments in Satellite Communications, to be chaired by *Prof. F. Lyall* (U.K.);¹ (2) Definitional Issues in Space Law, to be chaired by *Prof. S. Gorove* (U.S.A.);² (3) Liability in Commercial Space Activities, to be chaired by *Prof. K.-H. Böckstiegel* (Germany);³ (4) Other Legal Matters, to be chaired by *Prof. V. Kopal* (Czech Rep.).⁴

¹ Authors are requested to discuss recent developments in satellite communications, addressing both practical and institutional aspects. Special attention may be given to ITU developments (structural and regulatory) and the legal aspects of the emergence of new communications systems in low earth orbit. Papers may also deal with the FANS concept, and ICAO developments, as well as with activities of specialized satellite communications organizations such as INTELSAT, INMARSAT OR EUTELSAT.

² This session will mainly serve to present the results of an IISL working group on definitional issues in space law. The work of this group has resulted in several draft definitions (such as astronaut, launching state, appropriate state, space object, space debris, etc.) which will be presented to and discussed during this session. A few additional papers dealing with this topic may be included.

³ Papers in this session should deal with the legal aspects arising from liability questions regarding space activities. Special attention should be given to waivers of liability and their validity in special cases, national developments, such as in the USA or Russia, regarding for instance liability for launch activities, as well as to the relationship between the "appropriate state:" and the commercial entity who engages in space activities. Also, questions of leasing in regard to liability for launches and insurance matters may be addressed.

⁴ In this session, papers may deal with varying topics of space law, but special attention should be given to recent developments which are of interest for space law. The work of the UNCOPUOS, national legal developments, new ventures in space, but also new focus on older topics may present questions of space law which the IISL needs to address.

Reviews

DROIT DE L'ESPACE, by Léopold Peyrefitte (Editions Dalloz, 1993), pp. 352.

This recent paperback written by Professor Léopold Peyrefitte of the University of Toulouse is a systematic exposition of the legal regime governing the exploration and utilization of outer space. In the introductory section, brief references are made to international agreements, international customary law and national legislation as well as to some of the fundamental principles of space law, including the principle of non-appropriation, freedom of exploration and use, the "benefit and interests" principle and the concept of the "common heritage of mankind." The introduction also dwells briefly on the delimitation of airspace from outer space and the status of the geostationary orbit.

As to the first part dealing with exploration, the author touches upon a multitude of topics. They include contracts for launch services and insurance; the status of space objects, their identification and return, international responsibility for damage caused by them and the requirements for their registration; the applicability of national legal systems, including the exercise of jurisdiction and control, in general, as well as on the international space station and on an international lunar station. Allusions are made to industrial property rights, including inventions and the manufacture of products in outer space and a more detailed overview of the status of astronauts is also provided.

The second part of the book dealing with the legal regime governing the utilization of outer space, focuses briefly on such topics as: (1) issues and organizations of space telecommunications, including Intelsat, Inmarsat, Intersputnik, Eutelsat, and ITU; (2) remote sensing, including obligations of the sensing State, the principle of State responsibility, nondiscriminatory distribution of remote sensing data and their protection under American (Landsat, Eosat) and French law (SPOT); (3) direct television broadcasting by satellite (DTBS) and terrestrial law.

As to DTBS, the author points to the absence of a universal international regulation and refers to U.N. Resolution 37-92, pondering its legal value. He contrasts prior consent with free dissemination, assesses consensus decision making versus majority rule, and draws attention to European approaches, recalling the European Code of Good Conduct and some of the relevant institutional arrangements within the European Union of Radiodiffusion, the Council of Europe and the European Economic Community.

In presenting this rich panorama of topics, the author raises a number of interesting questions. While a brief review does not permit their detailed elaboration, by way of example, a few may be indicated. Among them are: the question of the legal nature of the space object's connecting link to the national legal system and the question of the

nationality of a space object. What are the rights of astronauts if they suffer damage or injury, or happen to be in distress? What laws govern astronauts in a spaceship millions of miles away from the Earth? Does the "envoys of mankind" designation make them lose their nationality of origin? Does a State have the right to obtain in a clandestine manner images from outer space of any area of another State without receiving authorization from that State? Such questions and several others are raised to which - through the author's pen - the law of outer space provides some answers by reference to certain traditional principles of terrestrial law adapted to the space environment and by recourse, at the same time, to such a novel concept as the "common heritage of mankind."

There is no question that the book is a solid treatment of the subject matter reflecting a clear organizational framework which should enable even a novice in the field of space law to follow with ease the textual expositions. Unfortunately, space law has now become a very extensive and ever-growing field, encompassing not only international space law, including international organizational law, but good many domestic laws, regulations and cases, especially in the United States and, to a much lesser extent, in some other countries, such as Russia, Great Britain, France, Sweden, Canada, and Italy, and it is difficult to do justice to it within the framework of a one-volume treatise. While the author makes legitimate references to the law of the air and maritime law, these appear to be at the expense of such neglected topics as the use of nuclear power sources in outer space, solar power satellites, a thorough analysis of the leading space treaties and an evaluation of many relevant policy alternatives, just to mention a few examples.

Notwithstanding these limitations, the paperback should be an instructive reading both for French-reading policy makers and practitioners and to such students enrolled in space law courses in law schools or political science departments, particularly if it can be supplemented with a companion booklet containing the text of the major space treaties and other relevant documents.

Prof. Stephen Gorove
Chairman, Editorial Board
JOURNAL OF SPACE LAW

SLOVAR MEZDUNARODNOGO KOSMICHESKOGO PRAVA
(*INTERNATIONAL SPACE LAW DICTIONARY*), published by the Russian Publishing House "Mezdunarodnye Otnosheniya" (International Relations), Moscow, 1992, pp. 295.

A unique book on space law was published in Russia in 1992 -- the year which had been declared by the United Nations Organization to be "The Year of Outer Space." The book is called "International Space Law Dictionary" and is written by a group of leading experts on space law from the Institute of State and Law of the Russian Academy of Sciences, Institute of International Relations, the Ministry of Foreign Affairs and Ministry of Defense. It was published by the Russian Publishing House "International Relations" and edited by professor Vladlen Vereshchetin, a member of the

UN International Law Commission and a Vice President of the International Institute of Space Law.

There is no other reference book on space law of such kind in Russia or in any other country. This is the first in the world of a concise encyclopedia of the main terms, notions, and descriptions of basic legal instruments pertaining to international and domestic space law. From the very first days, it became a rarity because of its reduced circulation (1200 copies).

Materials in the Dictionary are of great interest not only for lawyers and researchers of the theoretical aspects of space law but also for those who are engaged in space industry, for military people, journalists, students and for all those people who want to know about legal regulations of the exploration and use of outer space.

The Dictionary contains the description of a large number of agreements, signed by the USSR and other states in the field of exploration and use of outer space. The Russian Federation being the successor to the former USSR bears responsibility for the fulfillment of the assumed obligations.

Much attention in this edition is given to an analysis of the role of international organizations which deal with the exploration and use of outer space and their contribution to the development of international cooperation in this field. Many articles are devoted to the legal problems of the commercial use of space technology and participation by the private sector in space activities. Also, it is necessary to point out that readers can find in the Dictionary interesting and unique information about the legal regulation of space activities in Russian in the Commonwealth of Independent States, about the activities of the Russian Space Agency, the legal status of the "Baikonour" cosmodrome and other ground-based objects of space infrastructure on the territory of the former Soviet Union, etc.

Readers will also find in the book the main international space law treaties and Russian legislative texts on space law. These documents are given as a supplement.

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SPACE LAW - PAST, PRESENT AND FUTURE, by Carl Q. Christol
(Kluwer, 1991), pp. 513.

This work, published in 1991 by Kluwer, can be described as "the work of a lifetime of research and authorship on the subject of Space Law."

The publisher judiciously collected the most notable articles and essays written by Professor Christol between 1965 and 1990 into one volume, thus providing the opportunity to read or reread such important topics as "Remote Sensing in International Space Law," "Space Stations: Political, Practical and Legal Considerations," "Environmental Aspects of Activities in Outer Space" and "Suggestions for Legal Measures and Instruments for Dealing with Debris," to give but three examples.

Professor Christol demonstrates how consciousness of the importance of the role of law, and our awareness of global interdependence, is due, at least in part, to the birth and development of space.

In the last chapter of the book Professor Christol again breaks new ground by contributing stimulating, innovative thought to his chosen subject, pointing out that International Space Law will continue to focus on the "Opportunity to explore, exploit and use a common area and its natural resources for peaceful and beneficial purposes (for the citizens)." He makes another important point by stating that the law will engender a formal commitment "calling for the sharing of benefits" derived from the use and exploration of outer space.

One can only hope that Professor Christol's thoughtful writings will reach those who have the power to influence international law for the betterment of the future of mankind.

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STATE LIABILITY FOR OUTER SPACE ACTIVITIES, by B.A. Hurwitz
(Nijhoff, 1992), 221 pp. and 19 pp. annex.

This book examines questions surrounding state liability for outer space activities. In doing so, the book analyzes the 1972 Liability Convention and also discusses analogies from other areas of law in dealing with liability issues. What is particularly unique in the book is its discussion of the International Law Commission's treatment of its topic "International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law," demonstrating the role that space law has played in formulating the ILCs thinking on this topic and also in influencing customary international law. The author also proffers several suggestions as to amendments to the Liability Convention to solve the gaps in the convention. In addition, he devotes a chapter to the application of the Liability Convention in connection with the 1978 Cosmos 954 accident. The book is the first truly thorough treatment of liability issues in space law. The citations to space law literature dealing with the topic is quite extensive. What was disappointing, however, was the dearth of primary source citations, other than to the U.N. Yearbooks. Often, the author would mention a state's position on an issue, but the cite would not be to the U.N. COPUOS reports, but to another author who presumably had cited the UN documents. Nevertheless, the book is highly recommended to space and non-space lawyers alike, who have an interest in concepts of liability under international Law.

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Notices

THE DREAM MACHINES - AN ILLUSTRATED HISTORY OF THE SPACESHIP IN ART, SCIENCE AND LITERATURE, by Ron Miller (Krieger, 1993), pp. 714.

Arthur C. Clark, Chancellor of the International Space University wrote the Foreword to this unique compilation which leads the reader through the traceable pictorial and written history of the spaceship, starting with its archeology (ca. 360 B.C.-A.D. 1783), through the periods of its invention (1784-1899), experimentation (1900-1938) and the Second World War (1939-1945), down to its Golden Age (1946-1961) and the Dawn of the Space Age, covering the evolution of the Mercury and Apollo spacecraft and the Space Shuttle (1962-present). The book also includes appendices showing diagrams of U.S. and Soviet launch vehicles and a detailed bibliography. It may be read with interest by anyone who wonders where our space involvement all came from and where it is heading to.

SPACE TECHNOLOGY FOR DEVELOPING COUNTRIES - MAKING IT HAPPEN!, published and distributed by the American Institute of Aeronautics and Astronautics, 1993, pp. 137.

This soft-cover booklet contains the Proceedings of the UN/IAF/COSPAR/AIAA Symposium held at the World Space Congress, August 28-30, 1992 in Washington, D.C. It is a collection of useful contributions by specialists, technical experts and consultants from many developing and some developed countries (e.g., Canada, Italy, and the U.S.), providing insights into the approaches and know-how used and experiences gained in connection with the application of a novel technology in developing countries. A follow-up Symposium was held October 8-10, 1993 in Graz, Austria on the occasion of the 44th Congress of the IAF and the results are expected to be published in 1994.

PROCEEDINGS OF THE FIRST EUROPEAN CONFERENCE ON SPACE DEBRIS, edited by W. Flury (Darmstadt, 1993), pp. 741.

The first European conference on space debris, held in Darmstadt, Germany, April 5-7, 1993, was organized by the European Space Agency and co-sponsored by the Agenzia Spaziale Italiana, the British National Space Centre, the Centre National d'Etudes Spatiales and the Deutsche Agentur für Raumfahrtangelegenheiten. The published proceedings contain a wealth of information mostly on the scientific aspects of a problem that for more than a decade has evoked increasing concern by many reputable experts and policy makers and has also been discussed in the United Nations, - the dangers created by the growing number of space debris. The scientific and technical contributions made by many well-known experts are supplemented by briefer discussions of the legal and policy issues. The organizers of this conference deserve credit for arranging and publishing the results of this unique Symposium.

A. Books

- BÖCKSTIEGEL, KARL-HEINZ (ED.), MANNED SPACE FLIGHT - LEGAL ASPECTS IN THE LIGHT OF SCIENTIFIC AND TECHNICAL DEVELOPMENT (Carl Heymanns Verlag 1993).
 BÖCKSTIEGEL, KARL-HEINZ & MARIETTA BENKÖ (EDS.), SPACE LAW - BASIC LEGAL DOCUMENTS (Instalment 5, Kluwer 1993).
 DIEDERIKS-VERSCHOOR, I. H. PH., AN INTRODUCTION TO SPACE LAW (Kluwer 1993).
 FLURY, W. (ED.), PROCEEDINGS OF THE FIRST EUROPEAN CONFERENCE ON SPACE DEBRIS, Darmstadt, Germany 5-7 April 1993 (ESA-ESOC 1993).
 GOROVE, STEPHEN (ED.), UNITED STATES SPACE LAW - NATIONAL AND INTERNATIONAL REGULATION (Release 93-1, Oceana 1993).
 MILLER, RON, THE DREAM MACHINES (Krieger 1993).
 PEYREFITTE, LÉOPOLD, DROIT DE L'ESPACE (Dalloz 1993).
 TRAA-ENGELMAN, VAN H.L., COMMERCIAL UTILIZATION OF OUTER SPACE (Nijhoff).

B. Contributions to Books

- Alvarez, Román, *El Desarrollo de la Percepcion Remota en Mexico*, in: GALL, RUTH *et al.*, LAS ACTIVIDADES ESPACIALES EN MEXICO: UNA REVISION CRITICA 88 (Seg. ed. 1991).
 Alvarez, Román, *Utilización de Satélites Meteorológicos en Mexico*, *id.* at 80.
 Alvarez, Román, *La Estación Rastreadora de Guaymas*, *id.* at 117.
 Fadul, Ligia Maria/Fernandez, Fatima/Schmucler, Héctor, *Satélites de Comunicación en México*, *id.* at 121.
 Gall, Ruth, *Ciencias Espaciales Básicas en México*, *id.* at 63.
 Gall, Ruth, *Los Paises del Tercer Mundo Ante la Era Espacial*, *id.* at 48.
 Gall, Ruth, *Militarizacion del Espacio*, *id.* at 39.
 Gall, Ruth, *Satélites Artificiales, sus Aplicaciones y Consecuencias que de ellas Derivan*, *id.* at 13.
 Gall, Ruth, y Álvarez, Román, *La Comisión Nacional del Espacio Exterior en México. Evaluación de sus Actividades*, *id.* at 108.
 Gall, Ruth/Fadul, Ligia Maria /Alvarez, Román, *Los Diferentes Polos de las Actividades Espaciales en México*, *id.* at 205.
 Villalobos, Jose Humberto Castro, *México y el Desarrollo del Derecho del Espacio Ultraterrestre*, *id.* at 159.
 Böckstiegel, Karl-Heinz, *Commercially Relevant Aspects of the Draft Convention on Manned Space Flight*, in: BÖCKSTIEGEL, KARL-HEINZ (ED.), MANNED SPACE FLIGHT - LEGAL ASPECTS IN THE LIGHT OF SCIENTIFIC AND TECHNICAL DEVELOPMENT 176 (Carl Heymanns Verlag 1993).
 Bourély, Michel, *The Legal Status of Personnel on International Space Station Missions*, *id.* at 69.
 Carver, John H., *Factual Issues (Safety and Rescue)*, *id.* at 149.
 Doyle, Stephen E., *A View of the American Experience*, *id.* at 43.
 Durrance, Samuel T., *Observations from Space Platforms*, *id.* at 111.

*
 Compiled and edited by Michael A. Gorove, Boston University School of Law.

- Gorove, Stephen, *Draft for a Convention on Manned Space Flight - Definitional Issues*, *id.* at 185.
- Jasentuliyana, Nandasiri, *Legal Aspects of Human Safety and Rescue in Space*, *id.* at 165.
- Kolossov, Yuri M., *International Regulation of Human Beings' Presence in Outer Space*, *id.* at 35.
- König, Bernhard, *Welcome Address*, *id.* at 15.
- Kopal, Vladimir, *Some Problems Relating to the In-Flight Personnel Regime of Manned Space Objects*, *id.* at 85.
- Madders, Kevin, *The Formation of the European Astronauts Corps: The Legal Framework*, *id.* at 25.
- Merbold, Ulf, *The Astronauts' View: Experiences and Demands*, *id.* at 17.
- Messerschmid, Ernst, *Research in Space: Studying Materials, Processes and Life in Space*, *id.* at 97.
- Oosterlinck, René, *Protection of Remote-Sensing Data*, *id.* at 121.
- Ripoll, Andres, *Formation of the European Astronauts*, *id.* at 19.
- Stauder, Dieter, *Intellectual Property Regime for Scientific Research*, *id.* at 113.
- Williams, Maureen, *Benefits for Third Countries*, *id.* at 131.

C. Articles

- Böckstiegel, Karl-Heinz, *Settlement of Disputes Regarding Space Activities*, 21 J. SPACE L. 1 (1993).
- Burk, Dan L., *Protection of Trade Secrets in Outer Space Activity: A study in Federal Preemption*, 23 SETON HALL L. REV. 560 (1993).
- Cypser, D. A., *International Law and Policy of Extraterrestrial Planetary Protection*, 33 JURIMETRICS J. 315 (1993).
- Diederiks-Verschoor, I. H. Ph., *Quelques Réflexions sur les Aspects Juridiques des Mesures de Sécurité Relatives aux Équipages des Vols Spatiaux*, 12 ANNUAIRE DE DROIT MARITIME ET AÉRO-SPATIAL 379 (1993).
- Ezor, Jonathan Ira, *Costs Overhead: Tonga's claiming of Sixteen Geostationary Orbital Sites and the Implications for U.S. Space Policy*, 24 LAW & POL'Y INT'L BUS. 915 (1993).
- Gorove, Stephen, *Toward a Clarification of the Term "Space Object" - An International Legal and Policy Imperative?*, 21 J. SPACE L. 11 (1993).
- Heintze, Hans-Joachim, *The Increasing Use of Remote Sensing Satellites During Humanitarian Activities by the UN and Other States*, 42 ZEITSCHRIFT F. LUFT- UND WELTRAUMRECHT (ZLW) 278 (1993).
- Hobe, S. H./ Schrogl, K.-U., *»Space Benefits«: Towards a New International Order for Space*, 11 SPACE COMM. 3 (1993).
- Kamenetskaya, E./ Vereshchetin, V./ Zhukova, E., *Legal Régulation of Space Activities in Russia*, 9 SPACE POL'Y 121 (1993).
- Kohler, John F., *Space Pharmaceuticals: Will the United States Fumble Another High Technology Industry?*, 58 J. AIR L. & COM. 511 (1992).
- Kries, Wulf von, *Anti-Missile Defense for Europe and the Law of Outer Space*, 42 ZLW 271 (1993).
- Kuskuvelis, Ilias I., *The Space Risk and Commercial Space Insurance*, 9 SPACE POL'Y 109 (1993).

- McDermott, Bruce L., *Outer Space: The Latest Polluted Frontier*, 36 A.F. L. REV. 143 (1992).
- Pedersen, Kenneth S., *Is it Time to Create a World Space Agency?*, 9 SPACE POL'Y 89 (1993).
- Reynolds, Glenn H., *Outer Space and Peace: Some thoughts on Structures and Relations* (Symposium: *Environmental Rights and International Peace*), 59 TENN. L. REV. 723 (1992).
- Ritorto, Richard/ Mitchell, Michael S., *Telecommunications Satellite Insurance*, 18 AIR & SPACE L. 136 (1993).
- Salin, P. A., *Proprietary Aspects of Commercial Remote-Sensing Imagery*, 13 Nw. J. INT'L L. & BUS. 349 (1992).
- Salin, Patrick, *The Land Remote Sensing Policy Act of 1992*, 42 ZLW 263 (1993).
- Schrogl, Kai-Uwe, *The Structural Reform of ITU: Consequences for the Development of the Use of Outer Space and Space Law*, 42 ZLW 182 (1993).
- Showalter, Barton E., *In Space, Nobody Can Hear you Scream »Tort«!*, 58 J. AIR L. & COM. 795 (1993).
- Spude, Mathias/Oesberg, R.-P., *The ESA Council of Ministers Conference in Granada, 1992: Consolidation, Re-Orientation and New Perspectives*, 42 ZLW 162 (1993).

Reports

- Carroll, Will H., *The Role of Air Force JAG in the Early Development of the Law of Outer Space*, 20 THE REP. 1 (1993).
- Chipman, Ralph, *U.N. Scientific and Technical Subcommittee on Outer Space Holds Annual Meeting in New York*, 21 J. SPACE L. 30 (1993).
- Ferrazzani, Marco, *Legal Issues of Communications Satellites in LEO*, 21 J. SPACE L. 44 (1993).
- Flury, W., *Space Debris Mitigation and Policy Issues*, 21 J. SPACE L. 46 (1993).
- Heintze, Hans-Joachim, *Colloque International: The Law in Relation to Remote Sensing - Satellite Techniques for the Benefit of the Environment*, Strasbourg, 2-4 June 1993, 42 ZLW 305 (1993).
- Kosuge, Toshio, *International Conference on Air Transport and Space Applications in a New World*, 21 J. SPACE L. 54 (1993).
- Krämer, Paul Michael, *Gemeinsame Sitzung der Deutschen Gesellschaft für Luft- und Raumfahrt - Lilienthal-Obert e.V. (DGLR), Fachbereich S 6 »Luft- und Weltraumrecht« und der Deutschen Vereinigung für Internationales Recht (DVIR), Ausschuß »Luft- und Weltraumrecht«, Köln, 20 April 1993*, 42 ZLW 291 (1993).
- Madders, Kevin J., *"International Space Cooperation: Learning from the Past, Planning for the Future," Kona (Hawaii), 13-15 December 1992*, 21 J. SPACE L. 27 (1993).
- Malavialle, Anne-Marie, *The Law in Relation to Remote Sensing Satellite Techniques for the Benefit of the Environment*, 21 J. SPACE L. 52 (1993).
- Molino, Marco, *Commercial and Industrial Applications in Space: Insurance Implications*, 21 J. SPACE L. 35 (1993).

- Ospina, Sylvia, *Second Pan-American Space Conference, Santiago (Chile), 26-30 April 1993*, 21 J. SPACE L. 50 (1993).
- Stoffel, Wilhelm, *European Space Agency: First European Conference on Space Debris, Darmstadt, 5-7 April 1993*, 42 ZLW 301 (1993).
- Stoute, Cheryl, *U.N. Legal Subcommittee on Space Convenes its Thirty-Second Session (22 March-8 April 1993)*, 21 J. SPACE L. 39 (1993).

Comments

- Rothblatt, M. A., *The Development of Satellite Communication Law in the FCC: Highlights of Ten Leading Decisions and Future Expectations*, 21 J. SPACE L. 54 (1993).

Case Note

- Avtec Systems, Inc. v. Peiffer, 21 J. SPACE L. 60 (1993).

Short Accounts

- Baillif, Anne/Prüfer, Christopher, *Erster europäischer <Summer Course> über Weltraumrecht und -politik, Messina, Italien 7.-17. September (1992)*, 42 ZLW 234 (1993).
- Galloway, Jonathan, *Nuclear Issues and the Global Environment*, 21 J. SPACE L. 63 (1993).
- Gorove, Katherine M., *Settlement of Space Law Disputes*, 21 J. SPACE L. 64 (1993).

Book Reviews/Notices

- ANDEM, MURICE N., *INTERNATIONAL LEGAL PROBLEMS IN THE PEACEFUL EXPLORATION AND USE OF OUTER SPACE* (Gormley), 87 AM. J. INT'L L. 689 (1993).
- ANDEM, MAURICE N., *INTERNATIONAL LEGAL PROBLEMS IN THE PEACEFUL EXPLORATION AND USE OF OUTER SPACE*, Rovaniemi, 1992 (Wassenbergh), 21 J. SPACE L. 69 (1993).
- BENEDICK, RICHARD ELLIOT, *OZONE DIPLOMACY: NEW DIRECTIONS IN SAFEGUARDING THE PLANET* (McCaffrey), 87 AM. J. INT'L L. 486 (1993).
- BLACKLEDGE, ROBERT C./REDFIELD, CAROL L./SEIDA, STEVEN B. (EDS.), *PROCEEDINGS OF THE TENTH ANNUAL INTERNATIONAL SPACE DEVELOPMENT CONFERENCE - SPACE: A CALL FOR ACTION*, Univelt, 1991, 21 J. SPACE L. 74 (1993).
- CENTRE D'ETUDES ET DE RECHERCHES SUR LE DROIT DE L'ESPACE, *FAUT-IL CRÉER UNE ORGANISATION MONDIALE DE L'ESPACE?*, Paris, 1992 (K. Gorove), 21 J. SPACE L. 72 (1993).
- CHENG, CHIA-JUI/MENDES DE LEON, PABLO (EDS.), *THE HIGHWAYS OF AIR AND OUTER SPACE OVER ASIA*, Nijhoff, 1992, 21 J. SPACE L. 73 (1993).
- CHENG, CHIA-JUI/MENDES DE LEON, PABLO (EDS.), *THE HIGHWAYS OF AIR AND OUTER SPACE OVER ASIA*, Nijhoff, 1992 (Bourély), 186 REV. FRANCAISE DE DROIT AÉRIEN ET SPATIAL 276 (No.2, 1993).
- COURTEIX, S. ET AL., *FAUT-IL CRÉER UNE ORGANISATION MONDIALE DE L'ESPACE? REPORT BY A WORKING GROUP ASSOCIATED WITH CNRS*, Paris, 1992 (de Graaff), 42 ZLW 232 (1993).

- EUROPEAN CENTRE FOR SPACE LAW, SPACE LAW TEACHING IN EUROPE, Nijhoff, 1993, 21 J. SPACE L. 76 (1993).
- FRANCIONI, FRANCESCO/SCOVAZZI, TULLIO (EDS.), INTERNATIONAL RESPONSIBILITY FOR ENVIRONMENTAL HARM (La Fayette), 87 AM. J. INT'L L. 488 (1993).
- GIBSON, ROY, SPACE, OXFORD, 1992 (Knittlmayer), 42 ZLW 331 (1993).
- GLASER, PETER E./DAVIDSON, FRANK P./CSIGI, KATINKA I. (EDS.), SOLAR POWER SATELLITES: THE EMERGING ENERGY OPTION, New York/London/Sidney 1993 (de Graaff), 42 ZLW 337 (1993).
- GOROVE, STEPHEN, DEVELOPMENTS IN SPACE LAW: ISSUES AND POLICIES, Nijhoff, 1991 (Diederiks-Verschoor), 40 NETHERLANDS INT'L L. REV. 360 (1993).
- GOROVE, STEPHEN, DEVELOPMENTS IN SPACE LAW: ISSUES AND POLICIES, Nijhoff, 1991 (Bourély), 185 Rev. Francaise de Droit Aérien et Spatial 116 (No.1, 1993).
- HARRIS, PHILIP R., LIVING AND WORKING IN SPACE - HUMAN BEHAVIOR, CULTURE AND ORGANIZATION, Ellis Horwood, 1992, 21 J. SPACE L. 76 (1993).
- HEINTZE, HANS-JOACHIM (ED.), REMOTE SENSING UNDER CHANGING CONDITIONS, Bochum, Universitätsverlag Brockmeyer, 1992, 21 J. SPACE L. 75 (1993).
- HÖBE, STEFAN, DIE RECHTLICHEN RAHMENBEDINGUNGEN DER WIRTSCHAFTLICHEN NUTZUNG DES WELTRAUMS, Berlin, 1992 (Schrogl), 42 ZLW 231 (1993).
- HURWITZ, B.A., STATE LIABILITY FOR OUTER SPACE ACTIVITIES IN ACCORDANCE WITH THE 1972 CONVENTION ON INTERNATIONAL LIABILITY FOR DAMAGE CAUSED BY SPACE ACTIVITIES, Nijhoff, 1992 (Diederiks-Verschoor), 40 NETHERLANDS INT'L L. REV. 361 (1993).
- JASANI, BHUPENDRA (ED.), PEACEFUL AND NON-PEACEFUL USES OF SPACE: PROBLEMS OF DEFINITION FOR THE PREVENTION OF ARMS RACE, New York/London, 1991 (Heintze), 42 ZLW 333 (1993).
- JASENTULIYANA, N. (ED.), SPACE LAW: DEVELOPMENT AND SCOPE, Praeger, 1992 (K. Gorove), 21 J. SPACE L. 70 (1993).
- JOURNAL OF SPACE LAW, Vol. 20, No.1 (1992) (Bourély), 186 REV. FRANCAISE DE DROIT AÉRIEN ET SPATIAL 276 (No.2, 1993).
- KLEBER, PETER (ED.), SPACE COMMERCE '92, AMSTERDAM, 1993 (Knittlmayer), 42 ZLW 335 (1993).
- LEANZA, UMBERTO (ED.), THE FUTURE OF INTERNATIONAL TELECOMMUNICATIONS, Univ. Rome II & Oceana, 1993 (K. Gorove), 21 J. SPACE L. 71 (1993).
- MARTIN, PIERRE-MARIE, LES TEXTES DU DROIT DE L'ESPACE, Presses Universitaires de France, 1992, (Bourély), 185 REV. FRANCAISE DE DROIT AÉRIEN ET SPATIAL 116 (No.1, 1993).
- MARTIN, PIERRE-MARIE, LES TEXTES DU DROIT DE L'ESPACE, Presses Universitaires de France, 1992, 21 J. SPACE L. 76 (1993).
- MAYER, JILL S. (ED.), PROCEEDINGS OF THE SEVENTH ANNUAL INTERNATIONAL SPACE DEVELOPMENT CONFERENCE - SPACE: THE NEXT RENAISSANCE, Univelt, 1991, 21 J. SPACE L. 74 (1993).
- NICIU, M.I., INTRODUCERE IN DREPTUL INTERNATIONAL SPATIAL, Ed. Piramida Craiova, 1992 (Diederiks-Verschoor), 40 NETHERLANDS INT'L L. REV. 362 (1993).
- REIJNEN, BESS C.M., THE UNITED NATIONS SPACE TREATIES ANALYSED, Editions Frontières, 1992, 21 J. SPACE L. 75 (1993).
- VERESHCHETIN, V. S. (ED.), DICTIONARY OF INTERNATIONAL SPACE LAW, Moscow, 1992 (de Graaff), 42 ZLW 334 (1993).

WILLIAMS, SILVIA MAUREEN, DERECHO INTERNACIONAL CONTEMPORÁNEO: LA UTILIZACIÓN DEL ESPACIO ULTRATERRESTRE (Christol), 87 AM. J. INT'L L. 489 (1993).

D. Official Publications

Agreements

Agreement relating to the International Telecommunication Satellite Organization (INTELSAT) with annexes. Done at Washington Aug. 20, 1971. Entered into force Feb. 12, 1973. TIAS 7532; 23 UST 3813. *Accessions deposited*: Armenia, July 14, 1993, Bahrein. Aug. 23, 1993; Micronesia, Fed. States of, Sept 8, 1993.

Constitution of the International Telecommunication Union and Convention of the International Telecommunication Union (Geneva, 1992). Instruments of *ratification* deposited with the General Secretariat of the Union by Canada on June 21 and by Denmark on June 18, 1993.

Eritrea has acceded the the ITU Convention (Nairobi, 1982). The instrument of *accession* was deposited with the General Secretariat of the Union August 6, 1993.

Final Acts of the World Administrative Radio Conference for dealing with Frequency Allocations in certain parts of the Spectrum (WAR-92) (Malaga-Torremolinos, 1992). *Approved* by Canada.

Operating Agreement relating to the International Telecommunications Satellite Organization (INTELSAT) with annexes. Done at Washington Aug. 20, 1971. Entered into force Feb. 12, 1973, TIAS 7532; 23 UST 4091. *Signatures*: Armenia, July 14, 1993; Bahrein, Aug. 23, 1993, Micronesia, Fed. States of, Sept. 8, 1993.

Optional Protocol on the Compulsory Settlement of Disputes Relating to the Constitution of the International Telecommunication Union, to the Convention of the International Telecommunication Union and to the Administrative Regulations (Geneva, 1992). Instruments of *ratification deposited* by Canada June 21, 1993 and by Denmark June 18, 1993.

Treaty on Principles Governing the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies. Done at Washington, London, and Moscow Jan. 27, 1967. Entered into force Oct. 10, 1967. TIAS 6347, 18 UST 2410. *Succession deposited*:. Slovak Republic, effective Jan. 1, 1993.

U.S.-Argentina Agreement for Cooperation in the Civil Uses of Space, Buenos Aires, Aug. 6, 1991. Entered into force Aug. 6, 1991.

CONFERENCE ON DISARMAMENT

Report of the Ad Hoc Committee on the Prevention of an Arms Race in Outer Space, Doc CD/1217 (1993).

CONGRESS

- HOUSE COMMITTEE ON GOVERNMENT OPERATIONS, SPACE STATION [MICROFORM]: DELAYS IN DEALING WITH SPACE DEBRIS MAY REDUCE SAFETY AND INCREASE COSTS, REPORT TO THE SUBCOMMITTEE ON GOVERNMENT ACTIVITIES AND TRANSPORTATION (1993).
- HOUSE COMM. ON SCIENCE, SPACE AND TECHNOLOGY, HEARING TO CONSIDER ADMINISTRATION'S FY 94 BUDGET REQUEST FOR NASA PROGRAMS (APRIL 29, 1993).
- HOUSE COMM. ON SCIENCE, SPACE AND TECHNOLOGY, HEARING BEFORE THE SUBCOMMITTEE ON SPACE TO REVIEW REPORTED POTENTIAL COST GROWTH OF NASA SPACE STATION FREEDOM PROGRAM (MARCH 2, 1993).
- HOUSE COMM. ON SCIENCE, SPACE AND TECHNOLOGY, SUBCOMMITTEE ON SPACE, REPORT PROVIDING AN OVERVIEW OF NASA FY 94 BUDGET REQUEST (MAY 1993).
- HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY, THE FUTURE OF THE U.S. SPACE INDUSTRIAL BASE: HEARINGS BEFORE THE SUBCOMMITTEE ON SPACE, 103d Cong. 1st Sess. (Feb. 24, 17, 1993).
- HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY, REVIEW OF POTENTIAL SPACE STATION COST OVERRUNS: HEARING BEFORE THE SUBCOMMITTEE ON SPACE, 103d Cong. 1st Sess. (Mar. 2, 1993)..
- HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY, THE THREAT OF LARGE EARTH-ORBIT CROSSING ASTEROIDS: HEARING BEFORE THE SUBCOMMITTEE ON SPACE, 103d Cong. 1st Sess. (Mar. 24, 1993).
- HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY, WEATHER SATELLITES [MICROFORM]: ACTION NEEDED TO RESOLVE STATUS OF THE U.S. GEOSTATIONARY SATELLITE PROGRAM, REPORT TO THE CHAIRMAN (1991).
- HOUSE COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY, REPORT: NATIONAL ENERGY, ENVIRONMENT, AND COMPETITIVENESS RESEARCH ACT OF 1992, 102d Cong. 2nd Sess. Oct. 9, 1992 (1992).
- HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY, COMMERCIAL SPACE COMPETITIVENESS ACT OF 1992: REPORT (to accompany H.R. 3848 which ... was referred jointly to the Committee on Science, Space, and Technology and the Committee on Armed Services) (including cost estimate of the Congressional Budget Office) (1992).
- SENATE COMM. ON COMMERCE, SCIENCE, AND TRANSPORTATION, THE SPACE STATION FREEDOM AND SPACE LAUNCH ISSUES: HEARING BEFORE THE SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE OF THE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION, 102d Cong., 2d Sess., Mar. 18, 1992 (1992).
Old

ITU

- Final Acts of the World Administrative Radio Conference for dealing with frequency allocations in certain parts of the spectrum (WAR-92) (Malaga-Torremolinos, 1992).
- Final Acts of the Additional Plenipotentiary Conference (Geneva, 1992) - Constitution and Convention of the International Telecommunication Union, Optional Protocol, Resolutions, Recommendation.

NASA

- SPACE STATION FREEDOM: GATEWAY TO THE FUTURE (1992).

UNITED NATIONS

Applications of space technology for ocean resources development, doc. A/AC.105/535 (1992).
Applications of space technology for remote and rural communications and broadcasting, doc. A/AC.105/536 (1992).
International cooperation in the peaceful uses of outer space: activities of Member States, doc. A/AC.105/523 and Add.1 (1992).

E. Cases

American Satellite Co. v. The United States, 998 F.2d 950 (1993).
Hughes Communication Galaxy v. The United States, 998 F.2d 953 (1993).

F. Miscellaneous

IAA COSMIC STUDIES, 31 ACTA ASTRONAUTICA (Oct. 1993)
UN/IAF/COSPAR/AIAA, SPACE TECHNOLOGY FOR DEVELOPING COUNTRIES - MAKING IT HAPPEN (AIAA, 1993).
UNIDIR, TECHNICAL PROBLEMS IN THE VERIFICATION OF A BAN ON SPACE WEAPONS (Research Papers, No. 17, 1993).

I.

**Commercial Communication Satellites; Revisions to the
Commerce Control List, 15 CFR Part 799**

FEDERAL REGISTER VOL. 58, No. 172, 58 FR 47322 Wednesday, September 8, 1993
Rules and Regulations

DEPARTMENT OF COMMERCE Bureau of Export Administration [Docket No.
930813-3213]

ACTION: Final rule.

SUMMARY: This rule amends the Commerce Control List (CCL) of the Export Administration Regulations by revising ECCN 9A04 to include controls on components, parts, accessories, attachments, and equipment associated with commercial communication satellites also controlled under that entry. Previously Commerce controlled only commercial communication satellites under ECCN 9A04. Passive remote sensing ground stations and specially designed components, parts, accessories, attachments, and associated equipment that do not meet the parameters described in Category XV on the U.S. Munitions List (USML) are now controlled under Category 5 of the CCL. Radiation hardened microelectronic circuits that do not meet the parameters of Category XV of the USML are now controlled by Category 3 of the CCL.

This transfer of jurisdiction implements part of the Presidential directive of November 16, 1990, which mandated the removal from the USML of all items contained in the COCOM dual-use list (the International Industrial List) unless significant U.S. national security interests would be jeopardized. This rule makes the USML and the Commerce Control List more consistent with the Industrial List maintained by COCOM.

EFFECTIVE DATE: This rule is effective September 8, 1993.

FOR FURTHER INFORMATION CONTACT: Jerry Beiter, Office of Technology and Policy Analysis, Bureau of Export Administration. Telephone: (202) 482-1642.

SUPPLEMENTARY INFORMATION:

Background

On November 16, 1990, the President signed Executive Order 12735 on Chemical and Biological Weapons Proliferation, and directed various other export control measures including the removal from the USML of all items contained on the COCOM dual-use list unless significant U.S. national security interests would be jeopardized. To implement this part of the directive, a space technical working group was established. The group consists of representatives from the Departments of State, Commerce and Defense, as well as other U.S. government agencies. The result of the working group's recommendation was a final rule published on October 23, 1992, in the Federal Register by the Bureau of Politico-Military Affairs, Department of State (57 FR 48315). That rule removed certain commercial communication satellites from the International Traffic in Arms Regulations (ITAR) to the jurisdiction of the Department of Commerce, contingent upon publication of a Commerce rule establishing national security controls on commercial communication satellites. Commerce published that rule on October 23, 1992, adding these satellites to the Commerce Control List. At that time, all detailed design, development, manufacturing and production technical data, and all specially designed or modified components, parts, accessories, attachments, and associated equipment for satellites, including those covered by the CCL, remained controlled under subparagraph (d)(2) of Category XV on the USML.

On December 28, 1992, the Bureau of Politico-Military Affairs, Department of State published a rule in the Federal Register (57 FR 61589) that proposed to remove components, parts, accessories, attachments, and equipment associated

with commercial communication satellites and passive remote sensing satellite ground stations from the USML to the CCL. Only those components that are specifically designed or modified for satellites or other equipment controlled by Category XV of the USML will continue to be controlled under this Category. All other components of satellites not specifically designed for satellites controlled in Category XV will be controlled under the CCL.

A final rule is being published in the Federal Register by the Bureau of Politico-Military Affairs, Department of State simultaneously with this rule. That rule implements the changes first proposed in the December 28, 1992 Federal Register Notice, contingent upon publication of a Commerce rule establishing national security controls on components for commercial communication satellites.

All detailed design, development, manufacturing and production technical data still remains controlled under Category XV of the USML. However, Commerce does control other technical data, such as that level of technical data (including marketing data) necessary and reasonable for a purchaser to have assurance that a U.S.-built item controlled under ECCN 9A04 intended to operate in space has been designed, manufactured, and tested in conformance with specified contract requirements (e.g., operational performance, reliability, lifetime, product quality, delivery expectations). Commerce also controls technical data necessary to launch, operate and maintain satellites controlled by ECCN 9A04 and associated ground equipment.

This final rule also removes certain ground control stations and radiation hardened microelectronic circuits from the USML. This does not include technical data for launch vehicle/satellite compatibility, integration, or processing. Passive remote sensing ground stations and specially designed components, parts, accessories, attachments, and associated equipment that do not meet the parameters described in Category XV on the USML are now on the CCL under Category 5. Radiation hardened microelectronic circuits that do not meet the parameters of Category XV of the USML, and specially designed components, parts, accessories, attachments, and associated equipment therefore, are on the CCL under Category 3.

This rule amends the CCL by revising ECCN 9A04 to include controls on components, parts, accessories, attachments, and equipment specially designed for commercial communication satellites also controlled under that entry.

Rulemaking Requirements

1. This rule is consistent with Executive Orders 12291 and 12661.
2. This rule involves collections of information subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). These collections have been approved by the Office of Management and Budget under control numbers 0694-0005, 0694-0007, and 0694-0010.
3. This rule does not contain policies with Federalism implications sufficient to warrant preparation of a Federalism assessment under Executive Order 12612.
4. Because a notice of proposed rulemaking and an opportunity for public comment are not required to be given for this rule by section 553 of the Administrative Procedure Act (5 U.S.C. 553) or by any other law, under section 3(a) of the Regulatory Flexibility Act (5 U.S.C. 603(a) and 603(b)) no initial or final Regulatory Flexibility Analysis has to be or will be prepared.
5. The provisions of the Administrative Procedure Act (5 U.S.C. 553) requiring notice of proposed rulemaking, the opportunity for public participation, and a delay in effective date, are inapplicable because this regulation involves a military and foreign affairs function of the United States. No other law requires that a notice of proposed rulemaking and an opportunity for public comment be given for this rule.

Therefore, this regulation is issued in final form. Although there is no formal comment period, public comments on this regulation are welcome on a continuing basis. Comments should be submitted to Patricia Muldonian, Office of

Technology and Policy Analysis, Bureau of Export Administration, Department of Commerce, P.O. Box 273, Washington, DC 20044.

List of Subjects in 15 CFR Part 799

Exports, Reporting and recordkeeping requirements.

Accordingly, part 799 of the Export Administration Regulations (15 CFR parts 730-799) are amended as follows:

1. The authority citation for 15 CFR part 799 continues to read as follows:

Authority: Pub. L. 90-351, 82 Stat. 197 (18 U.S.C. 2510 et seq.), as amended; sec. 101, Pub. L. 93-153, 87 Stat. 576 (30 U.S.C. 185), as amended; sec. 103, Pub. L. 94-163, 89 Stat. 877 (42 U.S.C. 6212), as amended; secs. 201 and 201(11)(e), Pub. L. 94-258, 90 Stat. 309 (10 U.S.C. 7420 and 7430(e)), as amended; Pub. L. 95-223, 91 Stat. 1626 (50 U.S.C. 1701 et seq.); Pub. L. 95-242, 92 Stat. 120 (22 U.S.C. 3201 et seq. and 42 U.S.C. 2139a); sec. 208, Pub. L. 95-372, 92 Stat. 668 (43 U.S.C. 1354); Pub. L. 96-72, 93 Stat. 503 (50 U.S.C. App. 2401 et seq.), as amended (extended by Pub. L. 103-10, 107 Stat. 40); sec. 125, Pub. L. 99-64, 99 Stat. 156 (46 U.S.C. 466c); E.O. 11912 of April 13, 1976 (41 FR 15825, April 15, 1976); E.O. 12002 of July 7, 1977 (42 FR 35623, July 7, 1977), as amended; E.O. 12058 of May 11, 1978 (43 FR 20947, May 16, 1978); E.O. 12214 of May 2, 1980 (45 FR 29783, May 6, 1980); E.O. 12730 of September 30, 1990 (55 FR 40373, October 2, 1990), as continued by Notice of September 25, 1992 (57 FR 44649, September 28, 1992); and E.O. 12735 of November 16, 1990 (55 FR 48587, November 20, 1990), as continued by Notice of November 11, 1992 (57 FR 53979, November 13, 1992).

2. Supplement No. 1 to § 799.1, Category 9, is amended by revising ECCN 9A04A to read as follows:

9A04A -- "Spacecraft" (not including their payloads) and specially designed components therefor.

Note 1: (For the control status of products contained in "spacecraft" payloads, see the appropriate category.)

Note 2: For items other than those specified in this ECCN, exporters requesting a validated license from the Department of Commerce must provide a statement from the Department of State, Office of Defense Trade Controls, verifying that the item intended for export is under the licensing jurisdiction of the Department of Commerce.

Requirements

Validated License Required: QSTVWYZ.

Unit: Equipment in number; parts and accessories in \$ Value.

Reason for Control: NS.

GLV: \$ 0.

GCT: No.

GFW: No.

List of Items Controlled

a. Commercial Communication Satellites, except those with the following characteristics:

a.1. Anti-jam capability: Antennas and/or antenna systems with the ability to respond to incoming interference by adaptively reducing antenna gain in the direction of the interference;

a.2. Antennas:

a.2.a. With aperture (overall dimension of the radiating portions(s) of the antenna) greater than 30 feet; or

a.2.b. With sidelobes less than or equal to -35db; or

a.2.c. Designed, modified or configured to provide coverage area on the surface of the earth less than 200 nm in diameter, where "coverage area" is defined as that area on the surface of the earth that is illuminated by the main beam width of the antenna (which is the angular distance between half power points of the beam);

a.3. Designed, modified or configured for intersatellite data relay links that do not involve a ground relay terminal ("cross-links");

a.4. Spaceborne baseband processing equipment that uses any technique other than frequency translation which can be changed on a channel by channel basis among previously assigned fixed frequencies several times a day;

a.5. Employing any of the cryptographic items controlled under Category XIII (b) of the U.S. Munitions List;

a.6. Employing radiation-hardened devices controlled elsewhere in § 121.1 of the ITAR that are not "embedded" in the satellite in such a way as to deny physical access. (Here "embedded" means that the device cannot feasibly either be removed from the satellite or used for other purposes);

a.7. Having propulsion systems that permit acceleration of the satellite on-orbit (i.e., after mission orbit injection) at rates greater than 0.1 g;

a.8. Having attitude control and determination systems designed to provide spacecraft pointing determination and control better than 0.02 degrees per axis; or

a.9. Having orbit transfer engines ("kick motors") that remain permanently with the spacecraft and are capable of being restarted after achievement of mission orbit and providing acceleration greater than 1 g. (Orbit transfer engines that are not designed, built, and shipped as an integral part of the satellite are controlled under Category IV of the USML.)

b. [Reserved]

Note 1: Transferring registration or operational control to any foreign person of any satellite controlled by this entry must be authorized by an individual validated license. This requirement applies whether the satellite is physically located in the United States or abroad.

Note 2: All communication satellites identified in paragraphs a.1. through a.9. of this ECCN, and specially designed components, parts, accessories, attachments, associated equipment, and ground support equipment therefore, require a license from the Department of State, Office of Defense Trade Controls (see Category XV of the USML).

Dated: August, 30, 1933.

II

Amendments to the International Traffic in Arms Regulations (ITAR), 22 CFR Part 121

FEDERAL REGISTER, VOL. 58, No. 174, 58 FR 47636 Friday, September 10, 1993
DEPARTMENT OF STATE Bureau of Political-Military Affairs [Public Notice 1858]

ACTION: Final rule.

SUMMARY: This final rule is the result of a notice of proposed rule-making published in the Federal Register, 57 FR 61589, dated December 28, 1992. It amends the regulations implementing section 38 of the Arms Export Control Act, which governs the export of defense articles and defense services. Specifically, this rule moves remote sensing satellites and some ground stations for controlling remote sensing satellites, as well as relevant components, parts, accessories, attachments and associated equipment and technical data and defense services into Category XV of the U.S. Munitions List (USML). Accordingly, it removes those commodities from Category VIII (h), (i), (j) and (k) and Category XI (c) and (e) of the USML where, until now, they had been controlled. (See the Federal Register, 57 FR 15227, dated April 27, 1992.)

This rule reduces the burden on exporters by consolidating all spacecraft to be controlled under the USML, as well as all specifically designed or modified components, parts, accessories, and attachments of such satellites, and their directly related technical data and defense services, into a single category of the USML. At the same time, this rule initiates the movement off the USML to the Department of Commerce's Commerce Control List (CCL) of some ground stations for remote sensing satellites as well as all components, parts, accessories, attachments and associated equipment of spacecraft which have not been specifically designed or modified to provide the characteristics of capabilities described in Category XV which cause a spacecraft to remain under the control of the USML. The Department of Commerce is publishing separately a final rule under the provisions of the Export Administration Act, as amended, to amend the relevant Export Commodity Control Number (ECCN) category to include the spacecraft components, parts, accessories, and attachments and associated equipment being moved as a result of this rule.

EFFECTIVE DATE: This rule is effective September 8, 1993.

FOR FURTHER INFORMATION CONTACT: Kenneth M. Peoples, Office of Defense Trade Controls, Department of State, telephone 703-875-6619, or fax 703-875-6647; or Thomas Oldenburg, Office of Strategic Technology Affairs, Department of State, telephone 202-647-2432, or fax 202-736-7336

SUPPLEMENTARY INFORMATION: On November 16, 1990, the President [*47637] signed Executive Order 12735 on Chemical and Biological Weapons Proliferation and directed various other export control measures. The measures

directed by the President included removal from the USML of all items contained on the COCOM dual-use list unless significant U.S. national security interests would be jeopardized by such a move.

In implementing this directive, the Department created an interagency working group which reviewed the coverage of spacecraft and related components. Chaired by the Department of State, the Space Technical Working Group, (STWG) is comprised of representatives of the Departments of State, Commerce, Defense, and other executive agencies. The group was established to identify and recommend for removal from the USML commercial satellites and related articles covered by the COCOM Industrial List (IL) except where such movement would jeopardize U.S. national security interests. In pursuing this objective, the STWG has also sought to eliminate real or apparent overlaps between the U.S. Munitions List and the Commerce Control List. This rule derives from both objectives.

On September 5, 1991, the Department published in the Federal Register an advanced notice of proposed rule-making, establishing a new Category XV on the USML for spacecraft and related systems (56 FR 43894). A final rule formally creating Category XV for Spacecraft Systems and Associated Equipment was published in the Federal Register on April 27, 1992 (57 FR 15227).

The advanced notice of proposed rule-making which the Department published in the Federal Register on September 5, 1991, advised that a series of proposed rules would follow. Subsequent to the April 27, 1992, final rule, a final rule published on September 9, 1992 (57 FR 41077), identified military GPS receivers and moved them into the new Category XV. Another final rule, dated October 23, 1992, moved military satellites to Category XV and identified certain non-military communications satellites which have capabilities that justify keeping them on the USML in the interest of U.S. national security (57 FR 48315). That rule, along with a final rule published simultaneously by the Department of Commerce, moved all other complete commercial communications satellites to the export licensing control of the Department of Commerce. This final rule completes the internal movement within the USML to Category XV of all remaining satellites and the components, parts, accessories, and attachments and associated equipment specifically designed for those satellites, and all directly related technical data and defense services for those satellites. At the same time, in conjunction with a final rule being published simultaneously by the Department of Commerce, all generic satellite components, parts, accessories, attachments and associated equipment except where such equipment is specifically designed or modified to provide one or more of the characteristics or capabilities identified in Category XV of the USML as requiring control under the USML) are being moved from the USML to the CCL. In addition, under this final rule and the new Department of Commerce final rule referred to above, all passive ground stations for receipt of data from remote sensing satellites are being moved from the USML to the CCL; ground stations for remote sensing satellites which have USML encryption capability or uplink command capability will remain in Category XV of the USML.

The proposed rule published in the Federal Register on December 28, 1992, generated nine responses during the 30-day public comment period for the proposed rule. With a few exceptions, most of industry's comments focused upon language related to commercial communications satellites, which were published as a final rule on October 23, 1992. While the Department will consider those comments for possible future action, it does not intend to make any changes to the language regarding commercial communications satellites at this time.

One industry comment did touch upon the inclusion of certain radiation hardened integrated circuits (IC's) in the specific language of Category XV(e)(2). Heretofore, the USML controlled exports of a large proportion of radiation hardened IC's under the USML under Category XI; as a result of this final rule, all so-called "class 2" radiation hardened IC's previously controlled under the USML

are being moved to the CCL. Those radiation hardened IC's which the Department has determined should continue to be controlled under the USML are specifically identified in the language of Category XV(e)(2).

Other comments mentioned the language of Category XV(e), which controls all components, parts, accessories, attachments and associated equipment which are specifically designed, modified or configured for the items in Category XV. Industry recognized that the language moves a significant quantity of such components, parts, etc., off the USML, but expressed concern that some such components (for example, traveling wave tube amplifiers) must receive minor adjustments which do not affect their capabilities or characteristics in order to be usable in a specific satellite. Such a situation would result in some satellite components being subject to the CCL when the satellite for which it is being exported is on the CCL, while virtually identical components would be controlled on the USML when the specific satellite for which it is being exported is on the USML. The Department understands industry's concern in this instance and does not intend such a result; however, it has been determined that the clarification in this paragraph will suffice to put such concerns to rest without having to make any additional changes in the actual text of Category XV(e)(1). The language of Category XV(e)(1) captures only those specific components, parts, etc., of a satellite or military GPS receiver which are specifically designed, modified or configured to provide one or more of the characteristics or capabilities specifically identified in Category XV. All other components, parts, accessories, attachments and associated equipment specifically designed for satellites but not providing such a capability or characteristic will henceforth be under the export licensing jurisdiction of the Department of Commerce, regardless of whether the satellite is on the USML or the CCL. However, this paragraph regarding Category XV of the USML must not be used to infer movement to the CCL of equipment controlled under other categories of the USML. For example, military telemetry equipment continues to be controlled under Category XI of the USML, even though a specific export transaction of such equipment may be intended for end-use in a passive remote sensing ground station; in this situation, the ground station would also be controlled under the USML because of the inclusion of the military telemetry equipment capture in Category XI.

In addition to comments received from the private sector, the Department received from other Federal agencies several detailed technical suggestions related to language in Category XV(b), which controls remote sensing satellites. The STWG has requested and was granted additional time to review the technical merits of those proposals. However, because of the advantages to industry and to the United States Government of the transfer of material from the USML to the CCL implicit in the language of the December 28, 1992, proposed rule, the Department has [*47638] decided to enact the language of the December 28, 1992, proposed rule as a final rule and publish it in conjunction with a complementary final rule by the Department of Commerce. The STWG anticipates completing its review of the language of Category XV(b) on remote sensing satellites approximately 120 days following publication of this final rule. Any further changes (if any) to the language in the USML on remote sensing satellites will be made in a follow-on final rule at that time.

List of Subjects in 22 CFR Part 121

Arms and munitions, Exports.

Accordingly, for the reasons set forth above, title 22, chapter I, subchapter M (consisting of parts 120 through 130) of the Code of Federal Regulations is amended to read as set forth below:

PART 121-THE UNITED STATES MUNITIONS LIST

1. The authority citation for part 121 continues to read as follows:

Authority: Sec. 38, Arms Export Control Act, 90 Stat. 744 (22 U.S.C. 2778);

E.O. 11958, 42 FR 4311; 22 U.S.C. 2658.

2. In § 121.1, Category XV is revised to read as follows:

§121.1 -- General. The United States Munitions List.

Category XV-Spacecraft Systems and Associated Equipment

* (a) Spacecraft and associated hardware, including ground support equipment, specifically designed or modified for military use.

(b) Remote sensing satellite systems as follows:

* (1) All Remote sensing satellites;

(2) Ground control stations for remote sensing satellites as follows:

(i) Ground control stations for telemetry, tracking and control of such satellites; or

(ii) Passive ground stations for remote sensing satellites having any of the following characteristics:

(A) Employing any of the cryptographic items controlled under Category XIII of this subchapter; or

(B) Employing any uplink command capability.

Note: For export licensing controls over any passive ground receive only stations for remote sensing satellites not having any of the above parameters nor any systems or major components controlled elsewhere under this subchapter, see the Commerce Control List.

(c) Communications satellites (excluding ground stations and their associated equipment and technical data not enumerated elsewhere in this § 121.1; for controls on such ground stations, see the Commerce Control List) with any of the following characteristics:

(1) Anti-jam capability. Antennas and/or antenna systems with ability to respond to incoming interference by adaptively reducing antenna gain in the direction of the interference.

(2) Antennas:

(i) With aperture (overall dimension of the radiating portions of the antenna) greater than 30 feet ; or

(ii) With sidelobes less than or equal to -35dB; or

(iii) Designed, modified, or configured to provide coverage area on the surface of the earth less than 200 nm in diameter, where "coverage area" is defined as that area on the surface of the earth that is illuminated by the main beam width of the antenna (which is the angular distance between half power points of the beam).

(3) Designed, modified or configured for intersatellite data relay links that do not involve a ground relay terminal ("cross-links").

(4) Spaceborne baseband processing equipment that uses any technique other than frequency translation which can be changed several times a day on a channel by channel basis among previously assigned fixed frequencies.

(5) Employing any of the cryptographic items controlled under Category XIII (b) of this subchapter.

(6) Employing radiation-hardened devices controlled elsewhere in this § 121.1 that are not "embedded" in the satellite in such a way as to deny physical access. (Here "embedded" means that the device either cannot feasibly be removed from the satellite or be used for other purposes.)

(7) Having propulsion systems which permit acceleration of the satellite on-orbit (i.e., after mission orbit injection) at rates greater than 0.1g.

(8) Having attitude control and determination systems designed to provide spacecraft pointing determination and control better than 0.02 degrees per axis.

(9) Having orbit transfer engines ("kick-motors") which remain permanently with the spacecraft and are capable of being restarted after achievement of mission orbit and providing acceleration greater than 1g. (Orbit transfer engines which are not designed, built, and shipped as an integral part of the satellite are controlled under Category IV of this subchapter.)

(d) Global Positioning System (GPS) receiving equipment specifically designed, modified or configured for military use; or GPS receiving equipment with any of the following characteristics:

(1) Designed for encryption or decryption (e.g., Y-Code) of GPS precise positioning service (PPS) signals;

(2) Designed for producing navigation results above 60,000 feet altitude and at 1,000 knots velocity or greater;

(3) Specifically designed or modified for use with a null steering antenna or including a null steering antenna designed to reduce or avoid jamming signals;

(4) Designed or modified for use with unmanned air vehicle systems capable of delivering at least a 500 kg payload to a range of at least 300 km.

(Note: GPS receivers designed or modified for use with military unmanned air vehicle systems with less capability are considered to be specifically designed, modified or configured for military use and therefore covered under this paragraph (d)(4).)

Any GPS equipment not meeting this definition is subject to the jurisdiction of the Department of Commerce (DOC). Manufacturers or exporters of equipment under DOC jurisdiction are advised that the U.S. Government does not assure the availability of the GPS P-Code for civil navigation. It is the policy of the Department of Defense (DOD) that GPS receivers using P-Code without clarification as to whether or not those receivers were designed or modified to use Y-Code will be presumed to be Y-Code capable and covered under this paragraph. The DOD policy further requires that a notice be attached to all P-Code receivers presented for export. The notice must state the following: "ADVISORY NOTICE: This receiver uses the GPS P-Code signal, which by U.S. policy, may be switched off without notice."

(e) Components, parts, accessories, attachments, and associated equipment (including ground support equipment) as follows:

(1) Specifically designed, modified or configured for the articles in paragraphs (a) through (d) of this category.

(2) Radiation hardened microelectronic circuits that are specifically designed or rated to meet or exceed all five of the following characteristics:

(Note: For export controls on all other radiation hardened microelectronic circuits not captured below, see the Commerce Control List.)

(i) A total dose of 5×10^5 Rads (Si);

(ii) A dose rate upset of 5×10^8 Rads (Si)/Sec.;

(iii) A neutron dose of 1×10^{14} N/cm 2 ;

(iv) A single event upset of 1×10^5 - or less error/bit/day; and

(v) Single event latch-up free and having a dose rate latch-up of 5×10^8 Rads(Si)/sec or greater.

(f) Technical data (as defined in § 120.21) and defense services (as defined in § 120.8) directly related to the defense articles enumerated in paragraphs (a) through (f) of this category. (See § 125.4 for exceptions.) Technical data directly related to the manufacture or production of any defense articles enumerated elsewhere in this category that are designated as Significant Military Equipment (SME) shall itself be designated SME. In addition, detailed design, development, production or manufacturing data for all spacecraft systems and specifically designed or modified components thereof, regardless of which U.S. Government agency has jurisdiction for export of the spacecraft. (See § 125.4 for exceptions.) This restriction does not include that level of technical data (including marketing data) necessary and reasonable for a purchaser to have assurance that a U.S.-built item intended to operate in space has been designed, manufactured and tested in conformance with specified contract requirements (e.g., operational performance, reliability, lifetime, product quality, or delivery expectations), as well as data necessary to evaluate in-orbit anomalies and to operate and maintain associated ground equipment.

* * * * *

Dated: July 19, 1993.

- Arms Control (Disarmament), 141-146.
- Avtec Systems, Inc. v. Peiffer, 60-63.
- Böckstiegel, Karl-Heinz, *Settlement of Disputes Regarding Space Activities*, 1-10.
- Bogomolov, Vladimir, *Prevention of an Arms Race in Outer Space: The Deliberations in the Conference on Disarmament in 1993*, 141-146.
- Book Reviews/Notices, 69-77, 185-189.
 - Andem, Maurice N., *International Legal Problems in the Peaceful Exploration and Use of Outer Space* (Henri A. Wassenbergh), 69.
 - Blackledge, Robert C./Redfield, Carol L./Seida, Steven B. (Eds.), *Proceedings of the Tenth Annual International Space Development Conference*, 74-75.
 - Centre d'etudes et de recherches sur le droit de l'espace, *Faut-il créer une organisation mondiale de l'espace?* (Katherine M. Gorove), 72-73.
 - Cheng, Chia-Jui/De Leon, Pablo Mendes (Eds.), *The Highways of Air and Outer Space Over Asia*, 73-74.
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 - Flury, W., (ed.), *Proceedings of the First European Conference on Space Debris*, 189.
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 - Martin, Pierre-Marie, *Les textes du droit de l'espace*, 76.
 - Mayer, Jill S. (Ed.), *Proceedings of the Seventh Annual International Space Development Conference - Space: The Next Renaissance*, 74-75.
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