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A journal devoted to the legal problems arising
out of human activities in outer space

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LAW AND REGULATION OF SATELLITE COMMUNICATIONS IN THE UNITED KINGDOM

*Phillip Dann**

Introduction

There are four main areas of law and regulation in the United Kingdom (UK) which govern satellite communications. First, there is the regime established by the Outer Space Act 1986[1] which provides for the licensing of activities in outer space, including the launching and operating of space objects. Secondly, there is the law relating to telecommunications, to be found principally in the Telecommunications Act 1984.[2] Thirdly, there is the law relating to broadcasting, now to be found in the Broadcasting Act 1990.[3] Finally, radio transmissions are regulated under the Wireless Telegraphy Act 1949.[4]

These four pieces of legislation apply in all three jurisdictions making up the UK, namely, England (including Wales), Scotland and Northern Ireland. Broadly speaking, the various licensing requirements operate in parallel: so that, for example, the holder of a licence to launch a broadcasting satellite is not exempt from any applicable requirement to obtain a broadcasting licence; and the holder of a licence to run a satellite telecommunication system must also hold a relevant wireless telegraphy licence.

In concentrating on these particular areas of law, it should not be forgotten that other fields such as competition (anti-trust) law are relevant to satellite communications.

National law must be considered against the background of international obligations. The UK is a party to all of the space treaties concluded under the auspices of the United Nations (UN). It is a member of the International Telecommunication Union (ITU), INTELSAT, INMARSAT and EUTELSAT. It is, in addition, a member of the European Economic Community (EEC) which, as will be seen, exerts increasing influence in the regulation of both telecommunications and broadcasting.

In certain cases, UK legislation directly mirrors the UK's international obligations. In other cases, it provides a general framework in which compliance with such obligations can be achieved through

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* Partner, Bird & Bird, London; Honorary Visiting Senior Lecturer, University College London.

1 1986 Chapter 38.

2 1984 Chapter 12.

3 1990 Chapter 42.

4 1949 Chapter 54.

subordinate legislation or by decision of a government minister or regulator.

Regulation of Activities in Outer Space

It should be recalled that Article VI of the Outer Space Treaty[5] provides that States Parties to the Treaty shall bear international responsibility for national activities in outer space, including those of non-governmental entities. It also provides that the activities of non-governmental entities in outer space shall require authorization and continuing supervision by the appropriate State Party to the Treaty. Article VII provides that each State Party to the Treaty that launches or procures the launching of an object into outer space, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party or to its natural or juridical persons by such object. In furtherance of these principles, the Liability Convention[6] provides detailed rules for determining and enforcing the liability of a launching State. The Registration Convention[7] requires the launching State to register a space object in an appropriate registry which it shall maintain, and to notify certain information concerning the space object for registration by the Secretary-General of the United Nations.[8] In both treaties "launching State" means a State which launches or procures the launching of a space object, or a State from whose territory or facility a space object is launched.

It was against this background that the UK enacted the Outer Space Act 1986.[9] The long title is as follows:

> An Act to confer licensing and other powers on the Secretary of State to secure compliance with the international obligations of the United Kingdom with respect to the launching and operation of space objects and the carrying on of other activities in outer space by persons connected with this country.

Accordingly, section 3 of the Act provides that a person to whom the Act applies shall not carry on an activity to which the Act applies

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5 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, 18 U.S.T. 2410, T.I.A.S. No. 6437, 610 U.N.T.S. 205.

6 Convention on International Liability for Damage Caused by Space Objects, March 29, 1972, 24 U.S.T. 2389, T.I.A.S. No. 7762, 961 U.N.T.S. 187 .

7 Convention on the Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, T.I.A.S. No. 8480, 1023 U.N.T.S. 15.

8 *Id.* arts. II and IV.

9 *Supra* note 1.

except under the authority of a licence granted by the Secretary of State.[10] The scope of application of the Act is defined in the first two sections.

Section 1 provides that the Act applies to the following activities whether carried on in the UK or elsewhere:

(a) launching or procuring the launch of a space object;

(b) operating a space object;

(c) any activity in outer space.

Paragraph (a) takes into account the definition of "launching State" in the Liability and Registration Conventions. As an example of such an activity, British Satellite Broadcasting ordered two satellites which were launched from the United States for the purpose of direct broadcasting by satellite in the UK. The company has now merged with Sky Television, but the satellites are still operational.[11]

Paragraph (b) is more problematical. It would seem to apply to the operation of a satellite tracking, telemetry and command (TT&C) station. It would also seem to apply to the operation of a TT&C station from a remote control centre. It is less clear whether it applies to operational decisions, as opposed to the implementation of those decisions. For example, is the person who can decide to relocate a satellite, shut-down a transponder or move a steerable spot beam "operating" a space object, even though he can only implement his decisions by giving directions to a TT&C operator? It is also unclear whether operating a space object includes operating its communications payload, for example, by controlling the allocation of communications channels.

Paragraph (c) is wide in scope and would apply, for example, to the recent participation by a British astronaut in a space mission organized by the USSR.[12]

Section 2 provides that the Act applies to United Kingdom nationals, Scottish firms, and bodies incorporated under the law of any part of the UK. There is power to extend the application of the Act by an Order in Council to bodies incorporated under the law of any of the Channel Islands, the Isle of Man or any dependent territory.[13] This power has been exercised in relation to Guernsey, Hong Kong, the Isle of Man and Jersey.[14] It should be noted that the Act does not apply to the launch of a space object by a foreign national, even from the territory of the United

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10 Contravention of the prohibition is a criminal offence: § 12.

11 Burkitt, *Sky/BSB merger: What's going on?,* INT'L CABLE 50, 56 (Winter 1990/91).

12 Sunday Times, 2 April 1989.

13 § 2(3).

14 The relevant Orders in Council are: SI 1990/248; SI 1990/591; SI 1990/596; SI 1990/597.

Kingdom. The writer is not aware of the existence of any launch facility in the United Kingdom; and it may have been assumed by the legislative draftsman that the establishment of such a facility was unlikely.

There are certain exemptions from the licensing requirement. In particular, a licence is not required for activities in respect to which it is certified by an Order in Council that arrangements have been made between the UK and another country to secure compliance with the international obligations of the UK.[15] Also, the Secretary of State may by order exempt persons or activities from the requirement of a licence if he is satisfied that the requirement is not necessary to secure compliance with the international obligations of the United Kingdom.[16] These exemptions might apply, for example, in the case of a space science programme governed by a bilateral treaty; but they are less likely to cover activities relating to commercial satellite communications.

The granting of licences under the Act is within the discretion of the Secretary of State.[17] It should be noted, however, that the Secretary of State is required not to grant a licence unless satisfied that the activities authorized by the licence will be consistent with the international obligations of the UK.[18] A licence may be granted subject to such conditions as the Secretary of State deems fit;[19] and may in particular, contain conditions such as a requirement for the licensee to insure himself against liability arising from the licensed activity, or a requirement to provide information concerning the date and location of launch and the basic orbital parameters.[20]

The administration of the licensing powers under the Act is in practice dealt with by the British National Space Centre (BNSC) on behalf of the Secretary of State for Trade and Industry.

Section 7 of the Act requires the Secretary of State to maintain a register of space objects. It provides that, "[T]here shall be entered in the register such particulars of such space objects as the Secretary of State considers appropriate to comply with the international obligations of the United Kingdom."

One particularly stringent provision is section 10, which provides that a person to whom the Act applies shall indemnify Her Majesty's government in the UK against any claims brought against the government in respect to damage or loss arising out of activities carried on by him to which the Act applies. There is no limit to this indemnification, which applies potentially to claims brought either in national courts or on the international plane.

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15 § 3(2)(b).

16 § 3(3).

17 § 4(1).

18 § 4(2)(b).

19 § 5(1).

20 § 5(2)(f) and (b).

The precise conditions attached to any licence will depend on the nature and circumstances of a particular space activity, but there are certain basic conditions likely to be included in most licences.[21] These include an obligation on the licensee to conduct its operations so as not to create any risk of contamination of outer space or of adverse changes in the environment of the earth, or so as to jeopardize public health or the safety of persons or property in any part of the world.[22]

Certain of the basic conditions are of commercial significance in relation to the launch of communication satellites. The licensee may not dispose of the satellite or of the payload or any part thereof on termination of the licensed activities or otherwise without the prior written approval of the Secretary of State.[23] The licensee may not without such approval transfer or otherwise dispose of all or part of the control of any licensed activity.[24] Furthermore, without such approval the licensee may not transfer, charge or otherwise dispose of the legal or beneficial ownership of the satellite or of any TT&C station or facilities supporting the operation of the satellite.[25]

In addition to the indemnity provided for in section 10 of the Act, the basic licence conditions require the licensee to give an indemnity without limit against any loss suffered by the Secretary of State or any department of the Crown as a result of any breach of the licence conditions or any negligence in the conduct of the licensed activities.[26]

The licensee is required to take insurance in amounts and on terms approved by the Secretary of State in respect of liability for loss or damage suffered by the Crown or third parties in the UK or elsewhere as a result of the licensed activities.[27] The licensee is to ensure that the Secretary of State is a named insured.[28]

It is interesting to contrast the indemnity and insurance provisions with the regime established in the United States under the Commercial Space Launch Act Amendments of 1988.[29] These provide for maximum limits of insurance cover which may be required of the licensee, and provide also for an indemnification from the US government in respect of claims above the required amount of insurance, up to a limit of $1,500,000 (U.S.).[30] The more favourable regime reflects the findings of Congress as expressed in the amending Act, which are that the Federal Government

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21 Draft licence conditions supplied by BNSC.

22 *Id.* § 6.1.1.

23 *Id.* § 6.7.

24 *Id.* § 6.8.

25 *Id.* § 6.9.

26 *Id.* § 7.

27 *Id.* § 8.1.

28 *Id.* § 8.2.

29 35 U.S.C. app. § 2601 (Supp. 1991).

30 *Id.* § 5.

should encourage the US commercial space launch industry and that this industry must be competitive in the international marketplace.[31]

Regulation of Satellite Telecommunications

The Telecommunications Act 1984 lays down the framework for licensing a "telecommunication system". Under section 5, a person who runs a telecommunication system within the United Kingdom is, subject to certain exceptions, guilty of an offence unless he is authorized to run the system by a licence granted under the Act.

Section 4(1) defines "telecommunication system" as follows:

> . . . a system for the conveyance, through the agency of electric, magnetic, electro-magnetic, electro-chemical or electro-mechanical energy, of
>
> (a) speech, music and other sounds;
>
> (b) visual images;
>
> (c) signals serving for the impartation . . . of any matter otherwise than in the form of sounds or visual images; or
>
> (d) signals serving for the actuation or control of machinery or apparatus.

It is clear that this definition includes a satellite telecommunication system.

This definition is extended by section 4(2), which is of particular relevance to satellite telecommunication systems:

> For the purposes of this Act, telecommunication apparatus which is situated in the United Kingdom and
>
> (a) is connected to but not comprised in a telecommunication system; or
>
> (b) is connected to and comprised in a telecommunication system which extends beyond the United Kingdom,
>
> shall be regarded as a telecommunication system and any person who controls the apparatus shall be regarded as running the system.

31 *Id.* § 2.

It follows that the use of any satellite earth station in the United Kingdom will require a licence, whether or not the earth station is connected to the public networks, and whether or not communications with that earth station originate or terminate outside the United Kingdom.

The licensing power under the Act is conferred on the Secretary of State for Trade and Industry.[32] In exercising this power, the Secretary of State is obliged to consult with the Director General of Telecommunications, who heads the regulatory body OFTEL. The Secretary of State may delegate his licensing power to the Director General, although this has not yet occurred.[33] Licences may be granted to all persons, to persons of a class or to a particular person.[34] In the present context, class licences and individual licences are of particular importance.

In order to explain the particular regulatory structure of satellite telecommunications, it is necessary to consider the general history of telecommunications regulation in the United Kingdom. Before 1981 the Post Office had a monopoly over telecommunication networks, services and equipment. In that year, the Government separated the postal and telecommunications businesses of the Post Office. British Telecommunications (now "BT") took over the telecommunications business. In 1982 a competing public telecommunications operator, Mercury, was licensed, and in 1984 BT was privatized.[35]

In November 1983 the Government made the following statement:

> To avoid uncertainty, the Government has now decided to make it clear that we do not intend to license operators other than BT and Mercury Communications Limited to provide the basic telecommunications service of conveying messages over fixed links, whether cable, radio or satellite, both domestically and internationally during the seven years following this statement.[36]

This meant that satellite services were included in what became known as the "Duopoly Policy"; although in the same statement the Government indicated that it would keep under consideration ways of introducing new specialized services by satellite.

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32 Telecommunications Act 1984 § 7(1).

33 *Id.*

34 *Id.* § 7(3).

35 For a brief account of these developments see DEPT. OF TRADE & INDUSTRY, Competition and Choice: Telecommunications Policy for the 1990s, Cm 1303, Chapter 3 (1990). This was a Department of Trade and Industry Consultative Document issued in November 1990.

36 *Id.* Appendix 1.

As envisaged in this statement, a review of the Duopoly Policy was begun in November 1990.[37] Before then, however, limited measures of liberalization had already taken place. A class licence was issued for receive-only satellite dishes, permitting anyone in the UK to receive satellite signals of any type provided that the signal received is not passed on beyond the premises on which the dish is sited.[38] This class licence has been important in permitting the growth of direct broadcasting by satellite in the UK, which is discussed below. In 1988, seven specialized satellite service operators ("SSSOs") were licensed to provide one-way point to multi-point satellite services, for reception in the UK only. In 1989, the SSSO licences were extended to permit reception in Europe, but the restriction to one-way services remained. Because of these restrictions, the SSSO licences have not been greatly exploited although one operator, SIS, appears to have a well-established business which includes providing sound broadcasts of racing information to betting shops. It was noted in the Consultative Document that the SSSOs had not been able to develop VSAT (Very Small Aperture Terminal) services, because two-way services were thought necessary in order to create a viable business. It was also noted that the regulatory framework in other European countries did not in general permit such services.[39]

As a result of the recent consultation process known as the "Duopoly Review", the Government issued a White Paper in March 1991 called "Competition and Choice: Telecommunications Policy for the 1990s".[40] The most important conclusion was that the Government decided to end the Duopoly Policy. It announced that it would consider on its merits any application for a licence to offer telecommunication services over fixed links within the UK.[41] This opens up the prospect, for example, of additional public telecommunications operators being licensed to compete with BT and Mercury.

In relation to satellite services, however, the position is somewhat complicated. In its White Paper the Government announced that it intended to issue a class licence which would authorize provision of satellite services via systems which are not connected to the public switched network at either end.[42] The Secretary of State accordingly granted a class licence on 2 August 1991. The licence permits the provision of "any telecommunications service consisting in the transmission of messages to

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37 *Id.*

38 *Id.* 62.

39 *Id.* 63.

40 DEP'T OF TRADE & INDUSTRY, Competition and Choice: Telecommunciations Policy for the 1990s, Cm 1461 (1990).

41 *Id.* 11. As to international fixed services, see *infra*.

42 *Id.* 13.

or the reception of messages from earth orbiting apparatus".[43] This permits a wide range of services: one-way or two-way, point to point or point to multi-point, domestic or international. There are two important exceptions. The first is the transmission and reception of messages which have been or are to be conveyed by means of a public switched telecommunication system.[44] The second exception is the reception of television and sound broadcasts for subsequent delivery to two or more dwelling houses by means other than wireless telegraphy.[45] This is of course a reference to satellite-to-cable systems which, as discussed below, are licensed under the Broadcasting Act 1990.

It should be emphasized that the use of class licence authorizes the use of receive or transmit earth stations, whether fixed or mobile.[46] The class licence, therefore, provides a framework not only for the development of VSAT services in the UK, but also for the development of, for example, land mobile-satellite services.

There is no charge or requirement of notification under the licence. There is a requirement to maintain in force a Wireless Telegraphy Act licence in respect of each earth station, unless it is exempted.[47] There are also provisions for the Director General to designate applicable standards for "essential interfaces";[48] for approval of apparatus connected directly or indirectly to any public telecommunications system;[49] and for the Director General to specify requirements relating to the specification, functioning or use of earth stations where these are necessary to fulfill any European Community obligation of the United Kingdom.[50]

The new class licence, therefore, makes immediate inroads into the former Duopoly. However, Government policy is much more cautious with respect to satellite services interconnecting with the public switched network. The White Paper contains this statement:

> The Government has decided that applications by [new] satellite service providers to interconnect with the public switched network will need to be considered on a case by case basis taking into account the scope of the interconnection proposed, the range of services to be provided and such other

43 Class license to Run Telecommunication Systems for the Provision of Satellite Telecommunication Services, August 1991, Schedule 3, para. 3.

44 *Id.* para. 3(i). There is a limited exception to this exception, where the only connection to the PSTN is via a satellite and with another telecommunication system which is itself authorized for connection to the PSTN under a separate licence.

45 *Id.* para. 3(ii).

46 *Id.* Annex A.

47 *Id.* Schedule 1, Condition 1.

48 *Id.* Schedule 1, Condition 2.

49 *Id.* Schedule 1, Condition 3.

50 *Id.* Schedule 1, Condition 4.

> factors as are judged relevant at the time. The Government would expect to judge any application for such satellite services against the criteria proposed for the relevant fixed services licence elsewhere in this White Pape.[51]

This statement leaves open the door to operators wishing to provide domestic satellite services connected to the public switched network. However, given the relatively small size of the UK, such services are unlikely to represent a significant business opportunity. With regard to international switched services via satellite, the reference to criteria proposed elsewhere in the White Paper leaves open little possibility for the time being for new operators to offer services in competition with BT and Mercury. The Government is reluctant to license any new international operators, whatever transmission medium they may use.

Various reasons were given in the original Consultative Document for this reluctance. First, it was recognized that the few countries including the UK which had authorized competing international carriers had all taken steps to ensure that their operators were not "played off against each other by foreign monopoly administrations".[52] Regulatory action was taken to ensure that, when BT and Mercury deal with monopoly carriers overseas, they generally work on the basis of the same accounting rate structure. The position taken in the Consultative Document was that, "While adopting the same accounting rate structure does not necessarily mean that operators have to make the same charges, it clearly limits their scope to compete on price."[53] This is a rather unsatisfactory argument because other costs may vary considerably between operators, depending on their relative efficiency, which leaves distinct scope for price competition.

The second factor emphasized in the Consultative Document was the likely difficulty that new international operators would have in establishing agreements with foreign operators. The early experience of Mercury was cited in this respect.[54] It would arguably be more consistent with the present Government's general policy to let potential new operators decide for themselves whether they wished to take this risk.

Be that as it may, the question of new international operating licences was one of the few on which the Government took a more conservative position as a result of the Duopoly Review process. The White Paper refers to doubts expressed ". . . as to whether UK regulatory controls alone could ensure the development of effective competition if UK companies were not able to obtain equivalent licences overseas and if overseas regulators did not, for example, share the views of their UK

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51 *Supra* note 40, at 14.

52 *Supra* note 35, at 16.

53 *Id.* 62.

54 *Id.*

counterparts about what constituted anti-competitive behavior."[55] The conclusion from this and other considerations was that, ". . . while the Duopoly Policy in respect to new international operators should be ended, [the Government] is unlikely to grant new international operating licences in the short term and that it would therefore be premature at this stage to invite applications for such licences. The Government will, however, keep the position under review and will continue to press for a more open international telecommunications market."[56]

It should be mentioned briefly that there are certain other possibilities open to potential satellite service providers. Under the important class licence known as the Branch Systems General Licence, a service provider can re-sell capacity on BT or Mercury international private leased circuits (including satellite circuits) where one end only routes calls over a public switched network.[57] There is also a new class licence for self-provided telecommunication systems under which any person may run a telecommunication system (including a satellite system) for his own purposes.[58] Finally, in this respect, there is now a prospect that international simple resale of private leased circuits (included satellite circuits) will be permitted in certain cases. As used in the UK, the term "international simple resale" refers to the resale of capacity on international private circuits which are connected to the public switched networks at both ends. This, in effect, means that capacity could be leased from the existing international operators, BT and Mercury, and used to set up a competing telephone service. The Director General of Telecommunications has now advised the Secretary of State that international simple resale should be permitted, but only where equivalent liberalization has taken place in the other country concerned.[59] This change could be put into effect by a modification to the Branch Systems General Licence, coupled with the designation of "approved" countries on a case-by-case basis.[60]

The various licensing provisions so far discussed are generally neutral as to choice of space segment. For example, although BT is the UK Signatory to INTELSAT, EUTELSAT and INMARSAT, it is not restricted under its licence to offering services using those space segments. The new class licence for satellite services authorizes the connection of earth

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55 *Supra* note 40, at 12.

56 *Id.*

57 Class Licence for the Running of Branch Telecommunication Systems, November 1989, Condition 14.3, OFTEL, read together with the Specification issued by the Secretary of State dated 28 June 1991. It is expected that an amended version of this Licence will be issued before the end of 1991.

58 Class Licence for the Running of Self-provided Telecommunication Systems, August 1991, OFTEL.

59 OFTEL NEWS, October 1990, 1.

60 *Supra* note 57.

stations to any satellite provided, inter alia, that the relevant requirements for consultation under the INTELSAT Agreement, INMARSAT Convention and EUTELSAT Convention have been satisfied.[61] This refers to the requirements for notification of separate systems in, respectively, Article XIV(d) of the INTELSAT Agreement, Article 8 of the INMARSAT Convention and Article XVI of the EUTELSAT Convention.

Of course, operators wishing to use the INTELSAT, INMARSAT or EUTELSAT space segments in providing their services will have to obtain space segment capacity through BT, even though they may be using such space segments under their own licences. This applies, for example, to Mercury, to the SSSOs, and to persons operating under the new class licence. This requirement follows from Article XV of the INTELSAT Operating Agreement, which provides that any application for allotment of INTELSAT space segment capacity shall be submitted to INTELSAT by a Signatory. There are corresponding provisions in Article XV of the INMARSAT Operating Agreement and Article 16 of the EUTELSAT Operating Agreement.

BT may no longer have a monopoly in the provision of satellite services, but it still has a dominant position in this market. It is therefore not surprising that concern has been expressed that actual or potential competitors should have to obtain space segment capacity through BT. This may in effect require other operators to disclose to BT their business plans or other commercially confidential information. They will have to negotiate terms for the provision of space segment with BT and will not, in general, be able to discuss their requirements directly with the international satellite organizations.

In order to meet these concerns, two expedients have been adopted in the UK. The first is that BT has established a Signatory Affairs Office (SAO) to deal with requests from other operators for international satellite capacity. The intention is that the SAO should operate separately from BT's commercial arm. The Director General of Telecommunications has in the past indicated that he is satisfied with such arrangements for the time being but that a more satisfactory solution in the longer term would be to allow the international satellite organizations to deal directly with all service providers.[62]

This raises the difficult question of whether changes should be made in the treaty provisions governing the international satellite organizations in order to permit direct access to their space segment capacity. A full discussion of this question is beyond the scope of this

61 *Supra* note 43, Schedule 3, para. 2(ii)(a).

62 Review of British Telecom's Arrangements for the Provision of Space Segment: Statement from the Director General of Telecommunication, OFTEL, 28 November 1989. However, a further review of the Signatory Affairs Office is presently in progress: *Infra* note 8.

article.[63] However, a second expedient adopted in the UK provides an illustration of the flexibility which exists within the existing institutional provisions of the international satellite organizations. In response to the Consultative Document which began the Duopoly Review, the Director General of INTELSAT submitted certain comments to the Department of Trade and Industry.[64] He pointed out that the INTELSAT Operating Agreement permits INTELSAT, upon the advice of the local Signatory, to deal with other entities concerning access to the INTELSAT space segment. The following comments are worth quoting in full:

> It is up to each Signatory, in consultation with its own governmental authorities, to decide whether to utilize this flexibility and to precisely what extent. In this respect, and as you know, in March 1988 an arrangement utilizing this flexibility was entered into by INTELSAT and British Telecom, the United Kingdom's Signatory. Under the terms of that arrangement, INTELSAT agreed with BT's request to treat on the same basis as if it had been submitted by the UK Signatory any request received from Mercury Communications Limited (MCL) for reservation of space segment capacity or for the approval of an earth station, provided that the capacity or earth station is for the use of MCL, and approval of the reservation or of the earth station is within the Director General's own authority as delegated by the Board of Governors. It was also agreed that in accordance with Articles 14(c) and 15(c) of the [INTELSAT] Operating Agreement, BT remains liable for compliance with all applicable conditions regarding earth stations and approved allotments. The same concept is being pursued by several other parties and signatories.

Three points should be made in relation to these comments. First, it will be noted that INTELSAT agreed to this arrangement upon request of the UK Signatory. It may be inferred that INTELSAT would not agree to such an arrangement on the instructions of the relevant Party; although a Party could no doubt instruct its Signatory to request such an arrangement. Secondly, so far as the writer is aware, this arrangement was reached by agreement between BT and Mercury and was not imposed by OFTEL. Thirdly, again so far as the writer is aware, Mercury is the only operator in

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63 *See* David Gillick and Phillip Dann, *The European Policy and Regulatory Environment,* 9 SPACE COMM .121-30 (1992).

64 Letter dated 11 January 1991. Source: OFTEL

the UK to have benefitted from such an arrangement, with a minor exception in the case of the SSSOs.[65]

There have in fact been recent complaints by other satellite operators about the terms proposed by BT for access to international satellite capacity. Both British Aerospace and SIS protested to OFTEL against the conduct of BT's Signatory Affairs Office, which allegedly threatened to sell satellite capacity elsewhere if the operators refused to sign new contracts.[66] The operators complained specifically that the proposed contracts required them to pay two new charges: first, insurance premiums to cover themselves against damage to the satellite and interference with other signals; and secondly, a portion of BT's capital contributions to the relevant international satellite organization.[67] With regard to the insurance premiums, the operators already gave an indemnity against damage to the space segment, but wanted to determine their own insurance arrangements. The rationale behind the second of the charges is presumably that BT has to make capital contributions to each international satellite organization based on total UK usage of its space segment; so that BT would have to make capital contributions related to space segment utilization by other service providers. It appears that OFTEL has told BT to withdraw the two proposed charges pending the completion of an OFTEL review of the operations of the Signatory Affairs Office. This is expected to be completed towards the end of 1991.[68]

There is one further regulatory decision relating to satellite communications which is of particular interest. In March 1988 the Director General of Telecommunications issued a statement in response to representations made on behalf of PanAmSat, the independent satellite system operator.[69] PanAmSat had complained that BT was refusing to provide service linking customers in the UK to its satellite. PanAmSat alleged that this amounted to a breach by BT of various conditions of its licence, in particular Condition 1 (obligation to provide telecommunication services to any person requesting the provision of such services in the UK); Condition 5 (obligation to meet all reasonable demands for international connection services); and Condition 17 (prohibition on undue discrimination or preference in providing service to customers).

The Director General decided that, as PanAmSat did not itself have a place of business in the UK, and as no existing or potential customer in the UK had applied to BT directly for service, there was no breach of Conditions 1 and 5. He also found that there was no evidence of undue

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65 *Supra* note 62. The SSSOs may apply directly to INTELSAT or EUTELSAT for the reservation of occasional use space segment capacity, as opposed to leased space segment capacity. They must copy the Signatroy Affairs Office: Statement, Annex A.

66 FIN TECH, August 22, 1991, pp. 1-2.

67 *Id.*

68 *Id.*

69 Statement dated 18 March 1988, OFTEL.

discrimination. However, the decision can be seen as highly favourable to the independent satellite operators: the Director General made a clear statement that BT would be obliged by its licence, subject to certain limitations and exceptions, to provide uplinks from customers in the UK to a satellite run by PanAmSat. There were no grounds for enforcement action in response to PanAmSat's complaint simply because BT had not been shown to have refused any firm request from a customer in the UK for such a service.[70]

In concluding this section on telecommunications regulation, it is necessary to mention briefly some relevant developments in European Community law. The EEC has already introduced certain measures to liberalize the supply of telecommunications equipment and services. In this field the Community has generally proceeded by use of the legal instrument known as a directive. A directive is addressed to Member States and requires them to achieve a specific result. It is binding as to the result to be achieved, but leaves a discretion to the national authorities as to the form and method used to achieve that result.[71] For example, one Member State may choose to enact primary legislation, whereas another might achieve the same result by ministerial decree.

Arguably the two most important measures so far introduced are the Commission Directive on competition in the markets in telecommunications terminal equipment,[72] and the Commission Directive on competition in the markets for telecommunications services.[73] The first of these applies to satellite receive-only earth stations not connected to the public networks, but not to other satellite terminal equipment such as VSATs. The second does not apply to satellite services.

However, the Commission of the European Communities has now taken the first steps towards the liberalization of satellite communications on a Community-wide basis. In November 1990, it published a consultative document entitled "Towards Europe-wide Systems and Services - Green Paper on a Common Approach in the Field of Satellite Communications in the European Community".[74] This proposes four major changes:

> - full liberalization of the earth segment, including both receive-only and transmit-receive terminals, subject to any necessary type approval and licensing procedures;

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70 *Id.*

71 Treaty Establishing the European Economic Community (1957),Article 189.

72 Commission Directive 88/301/EEC of 16 May 1988 on competition in the markets in telecommunications terminal equipment, OJ L131, 27.5.80.

73 Commission Directive 90/388/EEC of 28 June 1990 on competition in the markets for telecommunications services, OJ L192/10, 24.7.90.

74 Commission of the European Communities COM (90) 490 final, 20 November 1990.

- free (unrestricted) access to space segment capacity, subject to licensing procedures in order to safeguard those exclusive or special rights and regulatory provisions set up by Member States in conformity with Community law: access to be on an equitable, non-discriminatory, cost-oriented basis;

- full commercial freedom for space segment providers, including direct marketing of satellite capacity to service providers and users, subject to the licensing procedures mentioned above and in conformity with Community law;

- harmonization measures as far as required to facilitate the provision of Europe-wide services, in particular, mutual recognition of licensing and type approval procedures, frequency co-ordination and co-ordination with regard to third country providers.[75]

Given that the UK has already liberalized the market for terminal equipment and, as indicated above, has substantially liberalized the market for satellite services, it can be seen that the UK is already in advance of European Community developments in several respects.[76]

The most controversial aspect of the Commission's proposals is the potential impact on the international satellite organizations. There appear to be on-going discussions between the Commission and EUTELSAT as to whether the sort of changes proposed by the Commission can be achieved without amendment to the EUTELSAT Convention and Operating Agreement.[77] There is a clear parallel with the issues raised during the UK Duopoly Review.[78]

The Commission has also issued "Guidelines on the application of EEC competition rules in the telecommunications sector".[79] Two points in these Guidelines are of particular interest in this context. The first is the statement that EEC competition rules fully apply to satellites.[80] The second is the indication that agreements between European telecommunications organizations concerning the operation of satellite systems in the broadest sense may be caught by EEC competition rules.[81]

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75 *Id.* 3.

76 Certain other European countries have liberalized satellite communications in varying degrees: *supra* note 63.

77 *See, e.g.*, FIN.TECH. 1-2 (May 2, 1991).

78 *Supra* note 64.

79 Official Journal of the European Communities [hereinafter OJ] 91/C 233/02.

80 *Id.* para. 124.

81 *Id.* para. 126.

Regulation of Satellite Broadcasting

At the end of March 1991, 1,389,000 homes in the UK either had individual satellite-receive dishes or were served by the small "community" dishes known as SMATV. A further 423,000 homes received satellite broadcast channels from cable.[82] Satellite and cable broadcasting is regulated by the Broadcasting Act 1990. This establishes the Independent Television Commission (ITC), which is the licensing and regulatory authority for television programme services in the UK provided by persons other than the BBC.[83] The Act also establishes the Radio Authority, which licenses and regulates sound broadcasting services in the UK other than those provided by the BBC.[84] Several sound broadcasting services are transmitted via satellites which include the UK in their footprints.[85]

The Act provides for the licensing of three categories of satellite broadcasting service. The first is the "domestic satellite service". This means a television broadcasting service where the television programmes included in the service are transmitted by satellite from a place in the UK on an allocated frequency and for general reception in the UK.[86] For this purpose "allocated frequency" is defined as "a frequency allocated to the United Kingdom for broadcasting by satellite".[87] This is a rather cryptic reference to frequencies allocated by the ITU in the Broadcasting-Satellite Service (BSS).

The ITC may grant such licences to provide domestic satellite services as they may determine.[88] There is at present one domestic satellite service operator in the UK. BSB Limited (later called British Satellite Broadcasting Limited) was appointed as a "DBS programme contractor" by the Independent Broadcasting Authority, the predecessor of the ITC.[89] Upon entry into force of the Broadcasting Act of 1990, this contract was replaced by a licence to provide a domestic satellite service.[90] The licence provides for the use of five channels allocated to the UK by the

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82 New Media Markets, 11 April 1991, 3.

83 Broadcasting Act 1990, §§ 1, 2.

84 *Id.* §§ 83, 84.

85 *See e.g.*, the list of radio services given in CABLE AND SATELLITE EUROPE,78-79 (Feb. 1991).

86 Broadcasting Act 1990 § 43(1).

87 *Id.* § 43(4).

88 *Id.* § 44(2).

89 Agreement for Appointment of DBS Programme Contractor, 16 July 1987. Source: IBA

90 Broadcasting Act 1990, Sch. 12, Part III.

1977 World Administrative Radio Conference (WARC).[91] However, the licence will be terminated at the end of 1992, for reasons discussed below.

The Broadcasting Act also provides for the grant of licences for a "non-domestic satellite service." The definition of such a service is complex and has two limbs:

> (a) a service which consists in the transmission of television programmes by satellite
>
> (i) otherwise than on an allocated frequency, and
>
> (ii) for general reception in the United Kingdom or in any prescribed country (or both),
>
> where the programmes are transmitted from a place in the United Kingdom; or
>
> (b) a service which consists in the transmission of television programmes by satellites
>
> (i) from a place which is neither in the United Kingdom nor in any prescribed country, but
>
> (ii) for such reception as is mentioned in paragraph (a)(ii),
>
> if and to the extent that the programmes included in it consist of material to be provided by a person in the United Kingdom who is in a position to determine what is to be included in the service (so far as it consists of programme material provided by him).[92]

Taking limb (a) of this definition, it should be noted that a service may be up-linked from the UK and intended for general reception in the UK, but it will nevertheless be classified as a "non-domestic satellite service" if it is transmitted other than on an allocated frequency. Limb (b) ensures that a satellite programme service which is effectively controlled from the UK and is intended for general reception in the UK does not avoid UK licensing controls merely because the signal is up-linked from another country.

The reference to "any prescribed country" in both limbs of the definition enables the UK to implement its obligations under the European

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91 *See* the Agreement referred to in note 89 above and the Supplemental Agreement dated 9 February 1990.

92 Broadcasting Act 1990 § 43(2).

Community Directive known as "Television Without Frontiers".[93] This Directive is intended to ensure, broadly speaking, that all broadcasters in the EEC are subject to the licensing controls of a Member State; but that they should then be able to transmit their broadcast services freely to other Member States. Article 2(1) provides as follows:

> Each Member State shall ensure that all television broadcasts transmitted
>
> - by broadcasters under its jurisdiction, or
>
> - by broadcasters who, while not being under the jurisdiction of any Member State, make use of a frequency or a satellite capacity granted by, or a satellite up-link situated in that Member State,
>
> comply with the law applicable to broadcasts intended for the public in that Member State.

This means that, for example, the UK should exercise regulatory control over a UK company transmitting a satellite broadcast service intended for reception in Denmark; or over a Danish company broadcasting such a service via an up-link in the UK.

Article 2(2) of the Directive provides that, subject to certain exceptions, Member States shall ensure freedom of reception and shall not restrict re-transmission on their territory of television broadcasts from other Member States for reasons which fall within the fields co- ordinated by the Directive. These "fields" include such matters as television advertising and sponsorship, the protection of minors and the right of reply. Member States must ensure that television broadcasters under their jurisdiction comply with such provisions of the Directive.[94] On the other hand, Member States are free to require television broadcasters under their jurisdiction to comply with more detailed or stricter rules in the areas covered by the Directive.[95] For example, Article 15 of the Directive lays down certain restrictive rules on television advertising for alcoholic beverages, but does not require a complete ban on such advertising. The UK remains free to prohibit broadcasters within its jurisdiction from broadcasting advertisements for alcoholic beverages. It could not, however, prohibit the reception or distribution of a French television channel which included such advertising.

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93 Council Directive 89/552/EEC of 3 October 1989 on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the pursuit of television broadcasting activities, OJ L298/23, 17.10.89.

94 *Id.* Art. 3(2).

95 *Id.* Art. 3(1).

An Order has now been made under the Broadcasting Act which specifies all the other countries of the EEC as "prescribed countries" for the purpose of section 43.[96] Taking into account this list of prescribed countries, the definition of "non-domestic satellite service" in the Broadcasting Act becomes consistent with the Directive. Limb (a) of the definition now covers any service up-linked from the UK and intended for general reception in the UK or any other EEC country or both. Limb (b) covers any service up-linked from a place outside the EEC but intended for reception in the UK or any other EEC country or both, provided that the programme content is substantially determined by a person in the UK. The crucial point is that neither part of the definition covers a service which is up-linked from another EC country but which is intended for reception in the UK. Under the scheme of the Directive, the Member State from which the service was up-linked should ensure that the service complies with its own broadcasting law; and the UK should ensure freedom of reception and should not restrict re-transmission of the broadcast, so that a UK licensing requirement would be inappropriate.

It should be noted that the ITC may not refuse an application duly made for a licence to provide a non-domestic satellite service, unless it appears that the service would not comply with certain basic principles, such as the due accuracy and impartiality of any news given, and the exclusion of matters offending against good taste or decency.[97]

Developments in technology have given particular importance to the non-domestic satellite service licence. When it was originally planned to award one or more DBS franchises, it was assumed that direct broadcasting to the home would require high-power satellites operating in the Broadcasting-Satellite Service. It was assumed that lower power satellites, operating in the Fixed-Satellite Service, would be used only to broadcast signals for re-transmission by cable systems or SMATV.

In fact, improvements in individual antenna and receiver design have meant that it is now possible to receive directly signals from medium power communications satellites using individual dishes of less than one metre in diameter and receivers which can be purchased at moderate cost from any number of television retailers. At the end of March 1991, 1,144,000 homes had individual dishes receiving signals from the Astra 1A satellite, whereas only 120,000 had dishes receiving signals from the Marco Polo satellite.[98] The Astra satellite, which is operated by the Luxembourg company SES, is a medium power satellite operating in the Fixed-Satellite Service. The Marco Polo satellite is the DBS satellite which was launched by British Satellite Broadcasting.[99]

Several UK broadcasters transmit programmes via the Astra satellite, and these are sometimes up-linked from the UK. They created

96 The Broadcasting (Prescribed Countries) Order 1991, No. 1820.

97 Broadcasting Act 1990 § 45(2), § 6(1).

98 *Supra* note 82.

99 *Supra* note 11.

unexpectedly direct competition for the UK's first DBS operator, British Satellite Broadcasting. There was a particularly bitter rivalry between British Satellite Broadcasting and Sky Television, which was broadcasting four channels on the Astra satellite.[100] The conflict was not sustainable. Towards the end of 1990, shortly before the new Broadcasting Act came into force, a merger was announced between Sky Television and British Satellite Broadcasting. The new venture is called British Sky Broadcasting and has been widely regarded as representing a victory for Sky Television. It was reported that the Independent Broadcasting Authority was considering the revocation of the DBS franchise on the grounds that the merged group contravened both foreign (non-EEC) and cross-media ownership restrictions in the 1981 Broadcasting Act.[101] Ultimately, however, the Authority decided that British Sky Broadcasting would be allowed to continue transmitting on the Marco Polo satellite until the end of 1992. This is partly to protect the owners of DBS reception equipment, which cannot be used with the Astra satellite. It was also announced that the ITC would in due course invite applications for use of the DBS frequencies.[102] Meanwhile, British Sky Broadcasting has also been granted a non-domestic satellite service licence.[103] This is to authorize its transmissions via the Astra satellite, which continue in parallel with transmissions via the Marco Polo satellite.

It remains to mention briefly the third class of satellite broadcasting licence which is provided for under the 1990 Broadcasting Act. This is the licence for a sound broadcasting service transmitted by satellite, which is awarded by the Radio Authority.[104] Generally speaking, the Radio Authority may grant such licences to provide satellite sound broadcasting services as they may determine.[105]

Both domestic and non-domestic satellite services are subject to the same general rules relating to programme content as apply to other licensed broadcast services. The ITC has a duty to secure that every licensed service complies with certain specified requirements: for example, that nothing is included in programmes which offends against good taste or decency; that news is presented with impartiality; that due responsibility is exercised with respect to the content of religious programmes; and that subliminal techniques are excluded.[106] The ITC is also required to draw up a general code giving guidance as to the content of programmes and a code relating to advertising and sponsorship.[107] The

100 Raymond Snoddy, *The Satellite Wars*, FINANCIAL TIMES, 16 October 1990, viii.

101 TIMES, 17 November 1990.

102 THE INDEPENDENT, 21 December 1990.

103 TIMES, 21 December 1990.

104 *Supra* note 84.

105 Broadcasting Act 1990 § 85.

106 *Id.* § 6(1).

107 *Id.* § 7, 9.

ITC has now published a Programme Code,[108] a Sponsorship Code[109] and an Advertising Code.[110] A detailed examination of the provisions of these codes is beyond the scope of this article, but it should be noted that they are one of the means through which the United Kingdom is able to comply with European Community directives and other international obligations. For example, paragraph 18 of the Advertising Code lists certain products and services which may not be advertised. The list includes tobacco products. This complies with Article 13 of the "Television Without Frontiers" Directive.[111] To take another example, Article 22 of the Directive provides that Member States shall take appropriate measures to ensure that television broadcasts do not include programmes which might seriously impair the physical, mental or moral development of minors, in particular those that involve pornography or gratuitous violence. Several provisions in the Programme Code give effect to this requirement, such as section 1.7, which provides that the portrayal of dangerous behaviour easily imitated by children should be avoided, and must be excluded at times when it is likely that large numbers of children will be viewing.

It should be added that the ITC Codes and the relevant provisions of the Broadcasting Act already discussed also provide a mechanism for implementing the UK's obligations under the European Convention on Transfrontier Television, which was concluded under the auspices of the Council of Europe.[112]

It can been seen that a framework of regulation has developed in Europe and in the UK which attempts to resolve the long-standing issues relating to transfrontier satellite broadcasting, in particular the question of prior consent. The possibility remains, of course, that a foreign satellite service may broadcast programmes which are unacceptable in the UK and which are not regulated in the country of origin in accordance with either the European Community or the Council of Europe requirements. The Broadcasting Act of 1990 therefore provides that the Secretary of State may make an order proscribing a foreign satellite service.[113] The ITC or the Radio Authority are required to notify the Secretary of State of any foreign satellite service which they believe is unacceptable and in respect of which they consider an order should be made.[114] Where the Secretary of State has been so notified, he may not make an order unless he is satisfied that this is in the public interest and is compatible with any international

108 Programme Code, February 1991, ITC.

109 Code of Programme Sponsorship, January 1991, ITC.

110 Code of Advertising Standards and Practice, January 1991, ITC.

111 *Supra* note 93.

112 Opened for signature 5 May 1989.

113 Broadcasting Act at § 177(1). A foreign satellite service is one trrasmitted from outside the UK and capable of being received in the UK: §177(6).

114 *Id.* § 177(2).

obligations of the UK.[115] Where an order has been made, it is a criminal offence to do any of certain specified acts in relation to the foreign satellite service. These include supplying any equipment for use in connection with the operation of the service; supplying programme material to be included in the service; advertising in programmes included in the service; publishing the times or other details of programmes included in the service; or supplying decoding equipment designed for use in the reception of the service.[116]

In this context it is relevant to mention also the licensing regime which governs the distribution of satellite broadcasts. Under the Broadcasting Act of 1990, a "local delivery service" is defined as a service which consists in the use of a telecommunication system for the purpose of delivering certain types of service (including a non-domestic satellite service) for simultaneous reception in two or more dwelling houses in the UK.[117] Licences to provide local delivery services are granted by the ITC.[118] They are frequently referred to as "cable franchises," but in fact such licences may permit the use of microwave as well as cable distribution. Local delivery operators typically offer a mixture of terrestrial and satellite broadcast services, and may also include programme services generated at the cable head. Under section 80 of the Act, the ITC may direct a local delivery operator not to relay television programmes broadcast from a place outside the UK if they are satisfied that it is appropriate to do so in pursuance of any international agreement to which the UK is for the time being a party.

It remains in this section to mention two current developments which are likely in the future to affect UK law and regulation. The first relates to the introduction in Europe of high definition television (HDTV). The Commission of the European Communities is proposing that in future all new television services, including satellite services, must use a broadcasting standard known as D2-MAC. D2-MAC is envisaged as an intermediate standard, leading to the eventual adoption of HD-MAC as a full HDTV standard for Europe.[119] The proposal represents a commercial opportunity for equipment manufacturers, but is resisted by broadcasters, because both cable operators and the viewing public would have to buy new equipment in order to receive broadcasts transmitted using the new standards.[120] At present the controversy remains unresolved.

A second development relates to the difficult question of copyright clearance in relation to cross-border satellite broadcasting. The Commission of the European Communities has published a Proposal for a Council Directive on the co-ordination of certain rules concerning

115 *Id.* § 177(4).

116 *Id.* § 178.

117 *Id.* § 72.

118 *Id.* § 73.

119 TECH EUROPE 16-18 (August/September 1991).

120 *Id.*

copyright and neighboring rights applicable to satellite broadcasting and cable re-transmission.[121] The preamble to the draft Directive recites that freedom of cross-border satellite broadcasting and the cable re-transmission of programmes from other Member States is still obstructed by a series of differences between national rules of copyright and some uncertainties as to the law. It also notes that a distinction is currently drawn for copyright purposes between broadcasting by direct satellite and broadcasting by communications satellite; whereas, since individual reception is possible and nowadays affordable with both types of satellite, there is no longer any justification for this differing legal treatment. There is further reference to the current legal uncertainty as to whether broadcasting by a satellite whose signals can be received directly affects rights in the country of transmission only, or in all countries of reception. There is also mention of the legal uncertainty where programmes transmitted across frontiers are fed into and re-transmitted through cable networks. There is a striking reference to legal certainty as a "prerequisite" for the free movement of broadcasts within the Community. The draft Directive contains a number of rules intended to resolve the current uncertainties. The proposal is for these to be adopted as common rules by all Member States. The draft Directive is currently subject to consultation.

Regulation of Radio Communications

The Wireless Telegraphy Act 1949 provides that no person shall establish or use any station for wireless telegraphy or install or use any apparatus for wireless telegraphy except under the authority of a licence granted by the Secretary of State.[122] The establishment or use of a wireless telegraphy station without a licence is a criminal offence. However, the Secretary of State may exempt certain classes of wireless telegraphy apparatus or certain classes of use of such apparatus from the licensing requirement.[123]

The operation of an earth station for the transmission or reception of telecommunications traffic via satellite will require a licence under the Act, subject to any exemptions. The same applies to the operation of a TT&C station.

As already mentioned, the existence of a telecommunications or broadcasting licence does not generally provide any exemption from the requirement to obtain a wireless telegraphy licence. However, if a wireless telegraphy and a telecommunications licence are both needed, an application for a licence under the Telecommunications Act will be

121 OJ 91/C 255/03, 1 October 1991.

122 Wireless Telegraphy Act § 1(1).

123 *Id.*

regarded as an application for both licences and forwarded to the Radiocommunications Agency.[124]

The Radiocommunications Agency was established as an executive agency of the Department of Trade and Industry on 2 April 1990. It is responsible for regulating the use of wireless telegraphy apparatus, and also represents the UK in international negotiations on radio matters.[125]

In the White Paper published at the conclusion of the telecommunications Duopoly Review, the Government announced that it does not generally see a need for there to be competitions for telecommunications licences, with the exception of cases involving scarce radio spectrum.[126] The Government is at present reviewing various proposals for competitive charging or tiered charging for licences for the use of the radio spectrum, and has announced that it will publish a consultative document on the issue in 1992.[127] It remains to be seen whether this will lead to "spectrum auctions". One may also speculate as to whether new policies might alter the competitive balance between, for example, cellular services and mobile-satellite services. Most intriguing of all, perhaps, is how this concern for efficient spectrum allocation may translate into positions taken by the UK at the 1992 Mobile WARC.

124 DEPARTMENT OF TRADE AND INDUSTRY, Telecommunications Act 1984: Notes for the Guidance of Applicants for a Licence to Run a Telecommunication System, 25 March 1991.

125 Radiocommunications Agency note RA 139, April 1990.

126 *Supra* note 40, at 18.

127 FINANCIAL TIMES, 2 October 1991.

NEW REGULATORY IDEAS AND CONCEPTS IN SPACE TELECOMMUNICATIONS+

Martin A. Rothblatt*

Introduction

Satellite communications is the space activity with the largest impact on society. International cooperation is required for satellite communications because the radio frequencies and earth orbits needed for this activity must be shared by many countries. The International Telecommunication Union (ITU) is the international institution responsible for coordinating global cooperation in the use of satellite frequencies and orbits.[1]

The ITU has developed methods of sharing satellite orbits and frequencies in a manner which are moderately efficient and equitable to countries lacking the current capability to launch satellites. It is hypothesized that the current methods can be improved with an ITU stock market on orbital slots. Under the proposed new method, "orbit/spectrum" shares currently in use would be distributed to all existing satellite system operators. Orbit/spectrum shares not yet in use would be sold by the ITU as a "privatization" action. The ITU would then serve as a clearing-house, or market, for the unrestricted purchase and sale of orbit/spectrum rights.

A fee on transactions, presumably brokered by securities firms as is done in other stock markets, would be established to cover the ITU's budget. This budget includes satellite communications development to aid emerging economies, and is now under downward pressure. New satellite systems would simply purchase at market prices those orbit/spectrum rights required for system implementation.[2] Owners of categories of rights, such as to frequency bands, could elect boards whose task would be to maximize value.

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1 International Telecommunication Union (ITU), Radio Regulations, art. XI (Geneva 1990).

2 The satellite systems may also be insured against certain losses. *See* Cassidy, *Current Status and Prospects for Space Insurance*, 19 J. SPACE L. 166 (1991).

Low earth orbit satellite systems present special additional issues which are addressed separately.

Defining the Stock

We should first ask ourselves "what is a satellite slot?" To be truly accurate would take a long answer, and one of the conclusions is that the term 'slot' itself is rather misleading. Basically, it is a property right in the frequency spectrum, which means it is a legally protected right to use radio waves over a geographic area, and the right to exclude others from technologically degrading the right, such as via radio interference. Perhaps the most unique aspect of a satellite slot is that the geographic area over which the frequency spectrum right extends is almost always at least nationwide, and sometimes global or semi-global. This is much greater than a television or cellular right, which never covers more than one city per license.

The term "slot" devolves from the assignment of satellites to specific orbital locations or orbits, in addition to their band of frequency spectrum. The orbital location limitations decrease the value of the frequency spectrum property right because the same frequencies can be used again, without technological harm, by different satellite systems at different orbital locations. The supply of slots is related to how many frequency bands current technology can transmit/receive from orbit, and how many satellite systems can re-use each frequency band for each portion of the earth's surface.

Slots usually get established in two steps. First, a country awards a satellite license to a prospective satellite operator.[3] Second, the country urges the International Telecommunication Union (ITU) to "recognize" the license by "registering" the satellite system as an official orbit/spectrum "assignment." Although this process takes years, the outcome gives the satellite operator international legal protection from interference with its slot. Since the dawn of the space age in the 1960's, "slot rights" have always been respected.

For example, one satellite slot designation is "100 degrees W.L., Ka-band, Fixed Satellite Service, United States." This designation belongs to the U.S. Government's ACTS satellite, scheduled for 1993 launch by NASA. There is a fairly ample supply of satellite slots under the coverage area of this designation because satellites may be technologically spaced 2 degrees apart at Ka-band for Fixed Satellite Service, and the United States can be "seen well" from orbital locations ranging from 70 to 130 degrees W.L. Hence, whatever value NASA's satellite slot has, there are about 30 more available (the difference between 130 and 70 degrees for U.S. coverage, divided by 2 degrees). The scarcity value would seem low.

As a second, contradictory example, consider the following satellite slot description: "101 degrees W.L., L-band, Land-Mobile Satellite Service,

3 In the United States this is done through the Federal Communication Commission's satellite licensing process; see 47 C.F.R. § 25 (Oct. 1, 1990).

United States." This designation belongs to American Mobile Satellite Corporation's satellite, scheduled for 1995 launch.[4] It is intended to provide communications to vehicles employing near-omni user terminals. There may be a very limited supply of L-band slots under the coverage area of this designation because the Land Mobile Satellite Service user terminals cannot discriminate well among satellites by orbital location. Hence, only about two such satellite slots could be granted at L-band, per coverage area. The scarcity value is very high in this case, especially as compared to the previous example.

It should be clear the the phrase "satellite slot" is a very general expression, and one must know details about it to assess its value, much the same as would be the case with the phrase "land parcel." This probably just enhances the business mystique of satellite slots since their value is not a commodity, but a consequence of numerous features requiring careful consideration. In short, it is a gamble requiring real skill.

Investor Skills

One of the investors' skills needed to evaluate the satellite slots of the 1990's is passing familiarity with the arcane concepts of "low earth orbit" satellites -- called LEOs for short -- and "spread spectrum" technology -- called Code Division Multiple Access for long. Instead of designating satellite slots by degrees W.L. as is done for geostationary satellites (all that we currently use for communications), LEOs are designated by orbital inclination and distance above the earth. For example, "0 degrees inclination, 1000 miles, 148 MHz, Mobile Satellite Service, Indonesia" designates a proposal to enable two-way paging via satellite in Indonesia using satellites in low earth orbit directly above the equator. This slot could be quite valuable because there may be only five (or less) frequencies such as 148 MHz scheduled to be available for LEO satellite service throughout the world. On the other hand, it may be less valuable if each LEO satellite system serves only a part of the world, such as Indonesia, thereby enabling other LEO satellite systems to use the same frequency to serve different portions of the world.

One other thing to be aware of in assessing slot value is whether more of the same kind of slot can be created via "spread spectrum." For example, the designation "100 degrees W.L., RDSS Band, Aeronautical Satellite Service, United States" was used for the Geostar System when the U.S. Government advised the world of its intention to claim this satellite slot. Since the Aeronautical Satellite Service requires near-omni antennas, it might first appear that this slot was very scarce. As with the Land Mobile Satellite Service discussed above, with near-omni antennas no other satellite slot could usually be assigned without fear of radio interference with the Geostar near-omni antennas. However, due to the technological magic of "spread spectrum" modulation -- used by the Geostar System --

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4 American Mobile Satellite Corporation, FCC Gen. Dkt. No. 84-1234 (January 6, 1992) (final decision on remand).

several different satellite systems can use the same frequencies, in the same coverage area, all with near-omni antennas, and still avoid harmful levels of interference with each other. [5] So, the scarcity value of an RDSS slot is reduced by the number of other spread spectrum RDSS systems that can operate over the same coverage area, about 10 for North America. There is a negative though: each spread spectrum system carries much less information than it might otherwise carry with "normal" modulation.

To summarize this brief elaboration on the definition of a satellite slot, consider this checklist of factors:

- Frequency Band -- Defined uniquely or vaguely
- Orbital Location -- Geostationary Longitude, Medium Orbit or LEO Inclination/Altitude
- Coverage Area -- National, Semi-Global or Global
- Service Type -- Antennas require how much satellite spacing
- Modulation -- Spread Spectrum or "Normal" (i.e. TDMA or FDMA)

By this author's count, there are approximately 600 slots nominally available. The exact number is a function of upcoming frequency allocation conferences, ever-changing technological implementation factors, and market penetration considerations.

The Potential for a Satellite Slot Market

The satellite market is impeded by the lack of freely tradeable satellite slot interests, such as stocks and bonds. It is not realistic to expect most sources of capital to become experts on the myriad details of the various satellite businesses. Hence, much business development capital is blocked from the capital-starved satellite industry. If a satellite slot market did exist, capital would flow much more easily into the satellite industry. The result would be a greater practical utilization of satellite slots to the ultimate benefit of all consumers. [6]

A satellite slot market could be created by the International Telecommunication Union defining a set of roughly 600 slots. Avoidance of interference between slots, when this issue arises, would be settled with standard frequency coordination procedures. Slot rights could be broken down into small enough fractional pieces so that many individuals or small companies and countries could afford to purchase interests. The majority of holders of slot rights could elect a Board of Directors which would in turn make decisions on the rental or sales price for the slot. Some slot boards would appoint managers to find the most valuable use for the slots, and thereby maximize the payoff to the holders of slot rights.

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5 For details, *see* MARTIN ROTHBLATT, RADIODETERMINATION SATELLITE SERVICES AND STANDARDS (Artech House 1987).

6 U.S. DEPARTMENT OF COMMERCE, NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, U.S. SPECTRUM MANAGEMENT POLICY; AGENDA FOR THE FUTURE 97-125 (1991).

The ITU could reserve for itself valuable jobs akin to those performed by the New York Stock Exchange today. These tasks would include serving as a clearinghouse for the sales of slot rights and arbitrating many disputes. Fees charged by the ITU for providing a slot market could be cloaked in the mantle of a value tax, thereby both supporting the ITU and providing it with a source of funds for pursuing global telecommunications development.

Although it is very difficult to envision the ITU or its member States embracing a satellite slot market, there is now a rare opportunity for such a bold move to be accomplished. The ITU has consented to looking into a major revision of its structure and has formed an important High Level Committee consisting of telecom experts from around the world to perform this task. The changes are expected to be accomplished by the mid-1990's. With the world's gradual recognition of the intrinsic benefits of business over bureaucracy, and of commerce over command decisions, perhaps now is the time to forge a satellite slot market as a new model for global resource development in the new millenium.

Special Considerations Unique to Low Earth Orbit Satellites

Much attention in the space community has recently focused on low earth orbit satellite communications systems as an alternative to the geostationary paradigm. Advantages attributed to low earth orbit systems include reduced launch expense, greater modularity, much less expensive user terminals, global service capability, and improved system characteristics for mobile communications.[7] These new low earth orbit systems also raise unique institutional and regulatory issues. It is not clear, for example, whether low earth orbit satellite systems require separate frequency allocations or can share in other satellite service spectrums. It is also not clear how equitable access to low earth orbit frequencies can be accommodated since each system has global coverage, making problematic the current regime of sharing orbit/spectrum by national geography.

The First Commercial Low Earth Orbit System

In early 1987, Geostar Corporation inaugurated the first commercial low earth orbit satellite communications service. Known as "System 1", Geostar equipped some 400 trucks and boats with palm-size transmitters capable of operating at a VHF band. Transmissions were relayed via two VHF payloads carried on the polar-orbiting NOAA satellite. The Geostar System 1 was so successful that two stolen trucks were recovered via the inherent position tracking capabilities of low earth orbit satellites.[8]

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7 Notice of Proposed Rulemaking, ET Docket No. 91-280, October 18, 1991 (FCC's proposed authorization of low earth orbit satellites).

8 ENCYCLOPEDIA BRITTANICA, *Yearbook of Science* (1988).

Geostar's System 1 presented unique legal questions because the VHF frequencies it used were reserved primarily for meteorological purposes. Nevertheless, authority was granted to Geostar for truck-tracking by the U.S. Department of Commerce to show the potential of such technology.

Eventually, Geostar transferred all of its users to its System 2, which was based on geostationary satellites operating at much higher frequencies. The geostationary satellites offered more continuous service and much higher data throughout capacity. Nevertheless, the commercial feasibility of low earth orbit communications satellites had been proven.

The Second Batch of Low Earth Orbit Systems

During 1990, within a few months of each other, four U.S. companies submitted proposals to the U.S. Federal Communications Commission (FCC) to receive and expand upon the Geostar System 1 concept. The first two companies, Orbital Communications (a subsidiary of rocket pioneer Orbital Sciences) and StarSys, Inc. (a subsidiary of a group of French banks and scientific industries) proposed expensive, $200 million constellations of sophisticated but small satellites. The other two companies, Leosat Corporation and VITA Corporation, proposed low-cost lightsats costing only $1 million each to build and launch. The FCC has now proposed to license all of these systems in new VHF frequencies, taken from governmental users, sometime in mid-1992.

The market focus of the second batch of low earth orbit satellite systems is to provide brief, two-way, alphanumeric communications anywhere in the world to low-cost (less than $100) user terminals. The user terminals can be inexpensive because they need output only 2 or 3 watts of power to reach the low earth satellites, compared to 20-40 watts needed to reach high orbit satellites. Also, by using the VHF band, it is possible to access the satellite via a standard car or truck FM radio antenna.

Each of the four possible system operators in the second batch of VHF low earth orbit firms has a unique market segment in mind. Leosat Corporation has focused on the Intelligent Vehicle Highway System,[9] whereas Orbital Communications has focused on handheld messaging terminals. StarSys highlights its environmental data collection capabilities while Vita emphasizes its ability to deliver electronic mail to researchers in Third World countries.

The second batch of low earth orbit satellite communications companies appear likely to be approved because they present few

9 The Intelligent Vehicle Highway System is a concept for automated traffic control and collision avoidance on a country's highways by using computer, communications, navigation and radar technology. *See* Sheldrick, *"Driving While Automated: Planning Smart Highways for Tomorrow's Smart Cars,"* 263 SCI. AM. 86 (1990).

regulatory problems. Each of the companies plan to cooperate with national authorities for selling service to users within each country.

Third Wave of Low Earth Orbit Satellites

During late 1990 and through mid-1991, a third wave of super-sophisticated low earth orbit proposals was announced. Led by a Motorola proposal called "Iridium", and followed by an Inmarsat concept called "Project 21", these satellite systems would all cost in excess of $1 billion, and would go far beyond the limited capability of Geostar's System 1.

The third wave of proposals all were designed to operate near the microwave frequency band and to provide normal cellular-phone type telecom service anywhere in the world. The third wave concepts involved many dozens of satellites, and global consortia rivalling traditional international organizations in size and scope.

The third wave of low earth orbit satellite proposals raise unique institutional and regulatory issues because they provide a central telecom service (voice communications), as compared to the more peripheral importance of position tracking services, or alphanumeric data messaging -- the traditional uses of low earth orbit satellites. A further concern is that there is not enough orbit/spectrum to accommodate all of the third wave proposals.

Notwithstanding the need to create appropriate regulatory and institutional structures for the advanced low earth orbit systems, it appears to be fairly certain that there are no major legal roadblocks. The experience of the world with global satellite communication has been quite positive. [10] The advanced technology of third wave low earth orbit satellites simply reduces the size of a satellite earth station until it is no larger than a cellular telephone. While telecom authorities may be reluctant to permit satellite cellphones to bypass their national networks, as a practical matter, there would be no way to enforce any kind of restriction for long.

Differences From Geostationary Satellites

Low earth orbit satellites do not remain stationary over a single portion of the earth's surface; geostationary satellites do. The single difference makes it impractical for low earth orbit satellites to be "domestic-service" only, and hence presupposes an internationally coordinated legal regime.

The international legal regime for low earth satellites can be limited to technical regulation, or could require the active approval of each country being radiated. The latter case applies to most other international satellite systems. It is suggested that low earth orbit satellites be

10 *See, e.g.,* Samara, *Space Law and the Development of International Business: Implementing a Satellite Sound Broadcasting Service,* 33 PROC. COLLOQ. L. OUTER SPACE 74 (1991).

considered approved for worldwide use so long as they meet a set of internationally agreed-upon technical criteria. If active approval of many countries were required, low earth satellite systems may be blocked. [11]

11 *See, e.g.*, WARC-92 Doc. 97-E, Proposal of the Federal Republic of Nigeria for the work of the Conference, 5 Feb. 1992:

> There is considerable doubt as to whether LEO and GEO systems can operate co-channel. Most non-GEO systems in operation today share by band segmentation (e.g. GPS and GLONASS). If multiple LEO systems cannot share co-channel then the first LEO system to occupy a frequency band will preclude any other administration's LEO system. This situation may be contrary to the principle of equitable access.
>
> Article 11 is based upon quantitative sharing of criteria for GEO systems. Such criteria do not yet exist for LEO systems. Thus, Article 11 cannot yet logically apply to bands open to LEO systems.
>
> Article 14 provides an approach to identify a frequency band for a new satellite service, but not permit the band to be used in derogation of the rights of other administrations with plans to implement the new satellite service. Once coordination of subsequent satellite systems can be assured, it will be possible to assure the coordination of multiple LEO systems in an MSS band. Implementation of such systems should be subject to Article 14.

EVENTS OF INTEREST

A. PAST EVENTS

Reports

Conference on Disarmament on Prevention of an Arms Race in Outer Space

In the exercise of its responsibilities as the multilateral disarmament negotiating forum in accordance with paragraph 120 of the Final Document of the First Special Session of the General Assembly Devoted to Disarmament in 1978, the Conference on Disarmament in Geneva established in 1985 an Ad Hoc Committee under item 5 of its agenda entitled "Prevention of an arms race in outer space." All these years in discharging that responsibility the Ad Hoc Committee has continued to examine and identify, through substantive and general considerations, issues relevant to this agenda item. Every year the Ad Hoc Committee reports on the progress of its work to the Conference on Disarmament. All together 39 permanent members and 22 observer States participate in the discussion of the item. In terms of the organization of work, the Ad Hoc Committee gives equal treatment to the subjects covered by its mandate and specified in its program of work. Accordingly, the Committee allocates the same number of meetings to each of those subjects, namely issues relevant to the prevention of an arms race in outer space, existing agreements and existing proposals and future initiatives. In 1991, in order to enhance the functioning of the Committee in qualitative terms, the Chairman (Argentina) introduced three non-binding indicative lists of topics based on the main aspects considered in 1990. This year, the work of the Committee was facilitated through the assistance of the Friends of Chairman who were appointed to deal with the following specific issues in open-ended consultations: terminological aspects, issues related to verification of ASATs and confidence-building measures. The Committee also benefited from the scientific and technical contributions of experts from various delegations.

Once again there was general recognition of the importance of the bilateral negotiations between the USSR and the USA, and it was stressed that bilateral and multilateral efforts were complementary. Many delegations emphasized that those negotiations did not diminish the urgency and the importance of multilateral efforts and reaffirmed that the Conference on Disarmament had the primary role in the negotiation of a multilateral agreement on the prevention of an arms race in outer space in all its aspects.

The Group of 21 which includes countries of Asia, Africa, Latin America and Sweden, considered that there was an urgent need to address this important agenda item to achieve progress. Many delegations of this Group underlined that in an era where the confrontation between the USA and the USSR had eased, other states had reasons to hope that arms

deployed on ground would not be supplemented with a threat from space that would provoke a counter attack and help in spiralling the arms race further into outer space. Reiterating that outer space was the common heritage of mankind, many delegations insisted that as such, it should be used exclusively for peaceful purposes, thus making it of vital importance to prevent an arms race in outer space. The Conference, in their view, should urgently fulfill its role by elaborating new instruments of a legal character which would, in an all-embracing and multilateral way, tackle the issue of the non-militarization of outer space. Some Eastern European delegations reiterated that the issues under discussion had a key meaning for international security and for the strengthening of strategic stability and required the combination of multilateral and bilateral approaches. In their view the Conference on Disarmament was the most appropriate forum for arrangements to keep outer space free from weapons. France stated that some stabilizing military activities deserved to be authorized. Since sometimes it was impossible to distinguish some civil activities from military ones, it was preferable to concentrate on the prevention of any aggressive use of space. Moreover, France also stressed the difficulties of a comprehensive prohibition of antisatellite weapons as such, since any space objects and ballistic missiles, as well as many ground-based systems, had potential antisatellite capabilities. One delegation of the Group of 21 pointed out that "peaceful" could not be equated with non-aggressive, and it could only be interpreted to exclude "military uses." The UK noted that the role of the Ad Hoc Committee and that of UNCOPUOS were separate and distinct. If the Ad Hoc Committee were to make any progress, this delegation suggested that two areas merited further study: definition and verification.

China reiterated that it had all along been opposed to the arms race in outer space and stood for the complete prohibition and thorough destruction of all kinds of space weapons. It pointed out that the arms race in outer space between the two major space powers had not ended, but on the contrary had taken on a new trend. It held the view that in order to effectively prevent an arms race in outer space, it was necessary that the two countries with the largest space capabilities should immediately adopt practical measures in undertaking not to develop, test or deploy any types of space weapons and destroy all the existing ones, including both ABMs and ASATs, and on the basis of this, conduct serious negotiations with a view to concluding an agreement that completely bans all space weapons. Members of the Group of 21 pointed out that there was a need to further analyze limitations of Article IV of the Outer Space Treaty. They also actively addressed the issues of CBMs, a comprehensive ban of ASATs, immunity of satellites, etc.

In 1991 once again much attention was paid to the principles and provisions of international law relevant to the prevention of an arms race in outer space. Some delegations stressed that the first paragraph of Article IV of the Outer Space Treaty represented a legal loophole exploited by some space powers to develop a new generation of weapons which could be placed in outer space. Though there was almost unanimous recognition

of the fact that the legal régime did place some limitations on certain weapons and military activities in space, it was emphasized that existing legal instruments left open the possibility of the introduction of weapons in space, other than nuclear weapons or other weapons of mass destruction. In this connection, several delegations called for the total prohibition of the development, production, stationing, stock-piling and use of space weapons and the destruction or transformation of existing weapons. The USA believed that the existing legal régime for arms control in outer space was equitable, balanced and extensive and it placed some legal restraints on virtually every type of weapon in space, and recurring predictions of an impending arms race in outer space had not been born out. France affirmed that the prohibition to deploy any weapons in space would neither be realistic nor efficient: it could indeed limit some stabilizing activities and, at the same time, would not take account of the other threats to space activities.

During the debates on the existing proposals and future initiatives the Group of 21 held the position that the Committee should focus on concrete proposals for measures with a view of conducting negotiations for the conclusion of an agreement to prevent an arms race in outer space in all of its aspects. Some members of the Western Group, while agreeing to discuss and study the proposals put forward before the Committee, considered that the political conditions were not ripe for in-depth negotiations on these proposals, or were not convinced that they were suitable areas for multilateral consideration. Egypt stressed that Article IV of the OST contained a built-in limitation as its scope did not extend to banning all types of weapons in outer space. It prohibited, inter alia, the placing, installing, and stationing of nuclear weapons and other weapons of mass destruction only. Its provisions did not therefore contain a clear-cut injunction to ensure that outer space is used exclusively for peaceful purposes. Egypt was of the view that the general objective should aim at establishing one legal régime, both for outer space as well as the Moon and other celestial bodies. It maintained that this could only be realized through a clear-cut provision declaring that outer space shall be used exclusively for peaceful purposes. Venezuela reiterated its proposal seeking to amend Article IV of the OST and to prevent the stationing in outer space of weapons other than nuclear and mass destruction weapons. Many delegations of the Group of 21 touched upon the destabilizing aspects of BMD. It had been proposed by many delegations that the present de facto moratorium by the two major space powers on testing of existing dedicated ASAT-systems should be formalized. In this connection, the USA stated that it did not believe verification schemes proposed to date were adequate for verifying compliance with an agreement on a comprehensive ASAT ban. Peru reiterated its formal proposal to amend Article IV of the OST so as to make its prohibition applicable to any kind of weapon and to contemplate the negotiation of an additional protocol for the purpose of prohibiting the development, production, storage and deployment of ASAT-systems which were not stationed in outer space. The proposal provided also for a second

additional protocol to deal with the verification system to ensure faithful compliance with the obligations assumed by the States parties.

CBMs and predictability measures of States' activities in outer space found positive response of some delegations. The USSR further elaborated the concept of open outer space suggesting that the key elements of a future multilateral agreement on confidence-building and predictability measures in space activities of States should include the following measures: 1) the strengthening of the 1975 Convention on Registration of Objects Launched into Outer Space; 2) the elaboration of "rules of the road" - a "code of conduct;" 3) the use of space-based monitoring equipment in the interest of the international community; and 4) the establishment of an International Space Inspectorate. The question of the functioning of the Registration Convention caused some delegations to reiterate the proposals on the strengthening of the régime established by the Convention. They observed that by providing specific information about the nature and functions of objects launched into outer space, the Convention constituted an indispensible database for any subsequent development designed to generate confidence in the uses of outer space. Additional parameters and information should be added to the items already present in Article IV of the Convention. Many delegations indicated that consideration of the verification issues would constitute an important and integral part of the Committee's work given the technological, political, commercial and even doctrinal aspects involved in considering a strengthened outer space régime. They reiterated the importance of verification and desirability of multilateral involvement therein. The USA put forward views on verification and stated the inability to construct a suitable and effective verification system could prevent agreements from being finalized.

Some members of the Group of 21, with reference to the ABM Treaty, noted that various political and technological factors posed important challenges and opportunities for the Treaty régime as it placed restrictions on testing weapons in an ABM mode, not permitting weapons to be tested in an ASAT mode. For those delegations some recent experiments and strategic initiatives like the SDI and GPALS raised important questions about compliance with the ABM Treaty.

1991 was marked again by the active participation of governmental and scientific experts in the work of the Committee. Thus, Canada introduced the results of the research dealing with definitions and terminology which was called the "Harmfulness Indexing Method." The same delegation presented new approches to the concept of keep-out zones and viewed their creation as an effective CBM. France recalled its proposal of a step-by-step approach, starting with the adoption by the international community, of the principle of non-interference with non-aggressive space activities, which should form the basis of a régime of CBMs. It also developed its proposal for the reinforcement of the 1975 Registration Convention, for rules of conduct for space objects, for measures of transparency and for an International Trajectory Center. It also introduced a proposal for regional transparency agencies, providing for access to

satellite imagery in the framework of regional agreements on confidence-and-security-building measures. An expert from Germany focused on the confidence-and-security-building aspects to be included in the provisions of the Protection régime for outer space. An expert from Belgium briefed the Ad Hoc Committee on the possibilities of current and future space technologies for disarmament verification. An expert from Italy addressed the problem of debris and military activities in space trying to assess the danger posed to artificial satellites by orbiting debris. It was underlined that plans for any space-based weapon system should be completely revised. An expert from Sweden dwelled on the possibilities of monitoring testing of existing and potential ASAT weapons.

It was agreed that substantive work on this agenda item should continue at the next session of the Conference and it was recommended that the CD reestablish the Committee with an adequate mandate at the beginning of the 1992 session.

*Vladimir Bogomolov**

Report on ITU's 1992 World Administrative Radio Conference in Torremolinos, Spain

During February 1992 representatives of 120 countries and international organizations convoked a special meeting to draft and sign a new treaty that would revise current space law governing satellite communications. This meeting, held 3 February 1992 - 3 March 1992 under the auspices of the International Telecommunication Union (ITU), was known by the acronym WARC-92. The meeting culminated in a treaty signing on March 2, 1992 which created a substantial body of new space law.

The agenda for WARC-92 consisted of three key issues relevant to space telecommunications: (1) authorization of satellite sound broadcasting, (2) permissibility of low earth orbit satellite communications, and (3) creation of new frequency allocations for space industrialization. In each of these areas the conference was typified by vigorous debate and eventual compromise on new rules of law. Based on WARC-92, it is expected that many new satellite services will be available to consumers in the 1990s and beyond. It is also expected that space station occupants and missions to other planets will have ample radio frequencies with which to conduct their operations.

In terms of global impact, the biggest winner at WARC-92 was probably the satellite sound broadcasting service. The WARC-92 treaty officially provides for countries to authorize satellites that are capable of broadcasting radio programmes directly to small, hand-held receivers

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anywhere in the world. Most observers felt this marked the beginning of the end for shortwave radio insofar as direct satellite radio broadcasting offers better sound quality, more reliable coverage and improved economics. The treaty authorizes 40 MHz in the valuable "L-band" (1452-1492 MHz) for satellite sound broadcasting on a worldwide basis. This is nearly twice the amount of frequency currently reserved for AM, FM and shortwave radio combined. Most of these frequencies may be used commencing in 1993, with the rest available from 1998.

The key debate at WARC-92 over satellite sound broadcasting involved developing countries demanding immediate access to the new technology so that their radio broadcast capabilities could catch up to those in the advanced economies. The United States, Japan and Europe, on the other hand, proposed delaying the new technology until the turn of the century. The advanced countries wanted to delay the technology, and move it to different and more expensive operating frequencies, because they had plans to use the L-band frequencies for new generation cellular phone systems. In the end, however, the developing countries prevailed, boosted by a throng of delegates from the WorldSpace Corporation and eloquent speeches made by the Moroccan and Nigerian delegates in particular.

Most of the time and attention of WARC-92 focused on the authorization of low earth orbit satellites for worldwide vehicle tracking and cellular phone uses. In the 1980s Geostar Corporation popularized the notion of hand-held devices communicating via satellite, but the technology was at that time insufficiently advanced to enable voice communications. Lacking voice capability, the Geostar concept eventually folded, but was soon to be reborn under a new technology. In 1990 Motorola Corporation invented a system called Iridium which enabled the Geostar frequencies to be used for cellular phone communications. Motorola developed Geostar's handheld terminals earlier, so there was no doubt that the Iridium technology would work in Geostar's frequencies.

Europe and Japan were not supportive of low earth orbit satellites because they saw little use for them in their geography -- land-based technologies work well when the distances involved are not too great. However, there was tremendous excitement on the part of the developing countries for low earth orbit satellites. As with satellite sound broadcasting, the developing countries saw low earth orbit satellites as an opportunity to "leapfrog" into cellular phone parity with the advanced economies.

The United States approved of low earth orbit satellites as its main priority for WARC-92. Dozens of industry lobbyists and high-level U.S. officials visited the WARC site to persuade fence-sitting countries. In the end, the previous Geostar frequencies were re-allocated for "Mobile Satellite Service" with the express approval to be used for low earth orbit satellites.

One interesting problem which arose was that the Russian Federation had begun to use the Geostar frequencies -- formally called the Radio Determination Satellite Service (RDSS) band -- for an expansion of their satellite navigation system called Glonass. There was exhaustive

technical debate as to whether the Glonass navigation system and the Iridium satellite-cellular system could use the same frequencies without mutual interference. In order to gain the vote of the Russian Federation, the United States ended up agreeing that any use of the RDSS band would be subject to avoiding any radio interference into the Glonass system.

One of the biggest winners from WARC-92 was the INMARSAT Organization, which is today the largest provider of mobile communications via satellite. Inmarsat was concerned that if U.S. low earth orbit satellites occupied all the key frequencies, then Inmarsat would not have sufficient spectrum for growth of its satellite system. This concern was shared by other countries since a low earth orbit system which uses its spectrum everywhere in the world, precludes any spectrum for a national-only coverage mobile satellite system in the future. Inmarsat and the other concerned countries succeeded in achieving a WARC-92 Resolution which required any low earth orbit satellite system to share its frequency band with other satellite systems. Since no one at the conference was sure how this could be technically accomplished, the matter was referred to the ITU's technical research arm, the International Radio Consultative Committee (CCIR). To further assuage the spectrum scarcity concerns, substantial new frequency allocations were made for Mobile Satellite Service at higher (and more expensive to implement) bands around 1.9 GHz and 2.6 GHz. Within days of the conclusion of WARC-92, Inmarst announced plans to use some of these frequencies.

Finally, the Conference agreed to create large blocks of new frequency bands for space operations services. These services include lunar base operations, Mars-Moon-Earth communications links, and space station communications. There was little controversy involving these new provisions, which were expertly managed by the Chairman of the CCIR's Scientific committee, *Mr. Hal Kimball* of the United States.

In summary, WARC-92 appears to have been the first ITU Conference in which the developing countries played a crucial, decisive role in favor of implementing new technology. The Conference also saw the emergence of block voting, with Europe voting as a 30-plus country block on most matters, and with similar but less cohesiveness among Latin American, African and Pacific countries in Asia. WARC-92 clearly proved itself as a successful mechanism for revising international space communications law to accomodate rapidly changing technology. As such, many more WARCs can be expected in the years to come.

*Martin A. Rothblatt**

* International Committee on Maritime Radiocommunications (CCIRM) Delegate to WARC-92

United Nations Scientific and Technical Subcommittee on Outer Space Holds Annual Meeting in New York

The Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space held its twenty-ninth annual session at United Nations Headquarters in New York from 25 February to 5 March 1992.

The Subcommittee, during its two-week session, continued its consideration of various questions relating to international cooperation in outer space activities, including the special theme for 1992, "space technology and the protection of the Earth's environment." The 53 Member States of the Subcommittee now include the Russian Federation, replacing the Soviet Union. Following the trend of recent years, East-West conflicts have essentially disappeared, while North-South differences on economic issues remain but are discussed in a nonconfrontational spirit.

The session was preceded, on 24 February, by a special session commemorating 1992 as International Space Year (ISY) and centering on the ISY theme, "Mission to Planet Earth." The ceremonial meeting included addresses by the President of the Space Agency Forum for International Space Year (SAFISY) and French Minister of Research and Technology, *Mr. Hubert Curien*, and by *Dr. Louis Friedman*, Executive Director of the Planetary Society, speaking on "Space Flight and Global Unification." The meeting also included a panel on "Space and the Global Change Programme," including presentations by the heads of the European Space Agency, the French *Centre National d'Etudes Spatiales* and the Brazilian Institute for Space Research, as well as senior officials from NASA, the Japanese National Aerospace Development Agency (NASDA) and the Indian Space Research Organization. In addition, an international scientific symposium on "Space Technology and the Earth's Environment," with speakers from Brazil, China, the United States and ESA, was organized by IAF and COSPAR to mark the occasion.

The Subcommittee conducted its annual review of the work of the Outer Space Affairs Division, including the United Nations Programme on Space Applications and the implementation of the recommendations of the UNISPACE 82 Conference. It also continued its consideration of issues relating to remote sensing, the use of nuclear power sources in outer space, the geostationary orbit and space communications,. and the protection of the space and Earth environment. Members of the Subcommittee also provided information on their national activities in the fields of space transportation, astronomy, planetary exploration, and life sciences and space medicine.

United Nations Programme on Space Applications

One of the major objectives of the United Nations in the field of space is to promote access by all countries, in particular the developing countries, to the benefits of space activities, and the Programme on Space Applications is carried out by the Outer Space Affairs Division under the

direction of the Subcommittee for that purpose. The Programme organizes short training courses, seminars, workshops and meetings of experts on remote sensing satellite communications and other space applications for economic and social development, for the benefit of participants from developing countries. The Programme also administers fellowships for long-term education in Austria, Brazil, China and the institutions of the European Space Agency.

The Subcommittee expressed its appreciation to the countries that had hosted and supported the Programme activities in 1991, including a workshop in India on space science, a workshop at the Canary Islands (Spain) receiving station on remote sensing, a workshop in China on space applications for disaster relief, a training course in the United States on environmental remote sensing, a training course in Germany on geological remote sensing, and a training course in Peru on remote sensing for agrometeorology. The subcommittee approved the proposed Programme for 1992 including workshops and training courses on remote sensing to be held in Ecuador, Sweden, the United States and Germany, a workshop on space science in Costa Rica and a conference on space communications for development in Asia.

The Subcommittee expressed its appreciation for the contributions of the host countries and other supporting countries that had made these activities possible, but also expressed its concern that the resources available to the Programme were not sufficient to meet the needs of the developing countries for such assistance.

The Programme also provided consulting services in support of a number of regional space efforts: the Programme is working with ESA to promote the use of remote sensing data received by the ESA receiving stations in Italy and the Canary Islands for projects in the countries of North and West Africa covered by those stations; assistance was provided to the government of Ecuador in the use of the Cotopaxi remote sensing receiving station as a regional facility; and the Programme assisted the Government of Chile in the preparations for the Second Space Conference of the Americas, to be held in Santiago.

A new initiative now being developed as part of the Programme on Space Applications is a plan for regional centers for space science and technology education, with an emphasis on educating university teachers who can pass their knowledge and skills on to large numbers of students. As a first phase, the centers would focus on remote sensing. During the Subcommittee session, a number of developing countries offered to host and support such centers, and technical and financial support from developed countries is being sought. The Subcommittee expressed its support for this initiative and urged support from other countries.

Use of Nuclear Power Sources in Outer Space

The major developments in the Subcommittee this year concerned the negotiations toward the principles relating to the use of nuclear power sources in outer space. In 1989, following many years of work on the

subject, the Subcommittee reached agreement on a set of scientific and technical criteria for the safe use of nuclear power sources in outer space. These criteria were then incorporated as draft principle 3 of the set of principles being negotiated in the Legal Subcommittee. At 1990 session of the Scientific and Technical Subcommittee, however, the United States announced that those criteria needed to be amended, while other delegations insisted that the agreed criteria should not be reopened, but if necessary could be revised following adoption of the full set of principles in accordance with a provision for revision. Independently, the IAEA and Sweden suggested that the criteria should be revised to conform with recent recommendations of the International Commission of Radiological Protection.

Discussions this year focused on finding a compromise solution to these disagreements. A possible solution was proposed by Canada in the form of a preamble to the set of principles which would limit their scope and recognize the need for future revisions. In particular, the draft preamble stated that the principles would apply only to nuclear power sources used for generating electric power on board space objects, thus excluding prospective new space applications of nuclear power, such as nuclear propulsion systems, from the scope of the principles. The preambular reference to revisions noted that they might be required by emerging nuclear power applications and evolving international recommendations on radiological protection.

While there was no agreement on the preamble in the Subcommittee, there did seem to be agreement that a compromise along those lines might be possible and that negotiations would continue at the session of the Legal Subcommittee from 23 March to 10 April 1992. The Legal Subcommittee will also try to reach agreement on the remaining three proposed principles, which together with the eight principles already agreed would compromise the full set. If agreement can be reached on the technical criteria principle and on the three remaining principles, it is possible that the full set of principles could be formally adopted as a General Assembly resolution at the end of the year.

Remote Sensing Environmental Monitoring and International Space Year

Remote sensing remained a largely uncontroversial topic, as it has been since the adoption in 1986 of the "principles relating to remote sensing of the Earth from space." The United States and France promoted international use of their commercial Landsat and SPOT systems, while India, Japan, Russia and ESA also encouraged international use of their remote sensing satellite systems. Many developing countries emphasized the actual and potential importance of satellite remote sensing to their development, but noted that the commercialization of remote sensing and the expansion in the number of systems, each with different technologies, was raising financial obstacles to the use of satellite data for resource management and environmental monitoring in their countries. The Subcommittee reiterated its view that remote sensing data should be

available to all countries at reasonable cost and that there was a need to provide assistance to meet the needs of the developing countries.

The Subcommittee reviewed the wide range of national and international activities underway and planned as part of International Space Year. It noted that the United Nations system and, in particular, the Programme on Space Applications, were planning a variety of educational activities emphasizing the participation of developing countries in International Space Year. In light of the focus of ISY on monitoring the Earth environment and the central role of space technology in global monitoring, the Subcommittee emphasized the importance of involving as many countries as possible, including developing countries, in ISY and other environmental monitoring programmes. The subcommittee noted the important new opportunites for environmental monitoring and international cooperation as a result of new planned satellite systems for radar remote sensing, ozone mapping and atmospheric and climate research.

The Geostationary Orbit and Space Communications

The Subcommittee continued its consideration of the geostationary orbit without making any progress towards resolving the different views on the subject. A number of developing countries reiterated their concern over the increasing congestion of the orbit and called for a special international regime for coordinating use of the orbit and ensuring equitable access by all States, particularly developing countries. Equatorial countries also reiterated their claims to special status with respect to the geostationary orbit. Developed countries reiterated their position that the question of access to the geostationary orbit was being effectively addressed in the International Telecommunication Union (ITU) and that improving communications technology was increasing the effective capacity of the geostationary orbit to meet the needs of all countries.

Space Debris

The question of space debris, while not formally on the agenda, was a matter of increasing concern to many delegations. The Subcommittee reaffirmed the importance of reducing the generation of space debris and noted that there was a need for further research on the question and for improved technology for monitoring debris in space. Many delegations felt that the question should be placed on the agenda so that the Subcommittee could begin formal consideration at its next session, but the United States insisted that formal international consideration would not be appropriate until further national research had been carried out. The Subcommittee agreed on the importance of international cooperation in addressing the problem of space debris.

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The 31st Session of the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space, 23 March - 10 April 1992

The Legal Subcommittee of the UN Committee on the Peaceful Uses of Outer Space (COPUOS) held its 31st session this year in Geneva at the Palais des Nations from 23 March to 10 April 1992 under the guidance of its Charman, Ambassador Vaclav Mikulka of Czechoslovakia. The session was convened in the same city and building where this body had started its activities just thirty years ago, in 1962.

Both Subcommittees of the COPUOS, the Scientific and Technical one and the Legal one, are composed of the same members as their parent body, i.e. of 53 Member States of the United Nations, but only 36 of them were present at this session of the Legal Subcommittee. In addition, though, two non-members were admitted to attend the meetings upon their request (Greece and Spain). Moreover, the observers of five specialized agencies and other international organizations (IAEA, ITU, ESTA, IAF a ILA) were also present.

In comparison with previous years, the general exchange of views remained rather limited this time, for only eleven delegations presented their views concerning the Subcommittee's agenda as a whole. A number of delegations preferred to address its individual items. The proceedings of the Subcommittee concentrated on three substantive points in the following order :

1. 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.

2. The elaboration of draft principles relevant to the use of nuclear power sources in outer space, with the aim of finalizing the draft set of principles at the current session.

3. Matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationory orbit, including 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.

None of the discussions on the above items led to conclusions that could be adopted by consensus. Nevertheless, the session as a whole can be characterized as constructive, bringing some new ideas and approaches even to those problems in which visible progress had not been expected. In one item, that on Nuclear Power Sources (NPS), an effort at finalizing the set of Principles under elaboration was developed particularly by means of informal consultations and negotiations. Still, the result elapsed. Nevertheless, as stated in the Report of the Subcommittee, the texts elaborated during these discussions "could provide a good basis for

reaching consensus... in the very near future,"[1] perhaps already during the forthcoming session of the COPUOS.

The main trends of discussions and the results of work of the 31st session of the Legal Subcommittee in these substantive points are described in greater detail below.

1. Exploration and Utilization of Outer Space for the Benefit and in the Interests of all States, Taking into Particular Account the Needs of Developing Countries

The discussion on this relatively new item, which was introduced on the Subcommittee's agenda on the basis of a compromise reached in 1988, developed for the first time into an exchange of views on a number of more specific issues. This was due to a number of documents which were produced during the recent years, including the views contained in responses of member States to the Secretary-General's notes verbales of 26 September 1988 and 20 December 1989. They concerned the priority of specific subjects to be discussed under this item, information on the national frameworks relating to principle I of the 1967 Outer Space Treaty and international agreements relevant to the subject of the item. These responses have been summarized in an analytical manner in a working paper[2] presented by the Chairman of the Working Group on this item *Dr. Reimunda Gonzales*, representative of Chile.

Moreover, at the last session of the Subcommittee held in New York, 1991, a group of developing countries consisting of Argentina, Brazil, Chile, Mexico, Nigeria, Pakistan, the Philippines, Uruguay and Venezuela, submitted a working paper which took the form of a draft General Assembly resolution. After a preamble, in which the aims of this exercise were spelled out, principles regarding international cooperation in the exploration and utilization of outer space for peaceful purposes were annexed.[3]

At this year session, the Working Group agreed to conduct a preliminary exchange of ideas on the provisions of this working paper, which proved to be meaningful for clarification of a number of issues. The general direction of this consideration was outlined in the introductory statement by the Chairman, in which the relation between principle I of the 1967 Outer Space Treaty and the language of General Assembly resolution 46/45 of 9 December 1991, which recommended that particular account in this regard should be taken of the needs of developing countries, was established.

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1 *See* Draft Report of the Legal Subcommittee on the Work of its Thirty-first Session, UN Doc. A/AC/105/C.2/L.190, Add 6 of 7 April 1992, paras. 18 and 19.

2 *See* UN Doc. A/AC.105/C.2/L/187 of 22 January 1992.

3 *See* UN Doc. A/AC.105/C.2/L.182 of 9 April 1991, in Report of the Legal Subcommittee on the Work of Its Thirtieth Session (25 March - 12 April (1991), UN Doc. A/AC.105/484 of 17 April 1991, Annex IV, pp. 46-49.

The working paper of nine countries included several significant principles which raised a lively discussion. For instance, in para. 2 of principle I it was stated that States with relevant space capabilities and outer space programmes bore a special responsibility in promoting international cooperation in space science and technology and in their applications. According to para. 1 of principle II, all States should have access to the knowledge and applications derived from the exploration and use of outer space on an equitable, non-discriminatory and timely basis. According to para. 3 of principle III, States should promote the exchange of material and equipment for, and the transfer of technology on, the utilization and exploration of outer space within just and equitable parameters of price and payment. And according to para 3 of principle IV, no arbitrary or discriminatory conditions should be applied to any knowledge and applications destined for the peaceful uses and exploration of outer space.

These are but a few examples of the provisions included in the draft resolution, which initiated most of the reactions on the part of advanced countries. They objected that States with existing space capabilities had obtained them by the utilization of their financial and personnel resources and that the freedom had to be given to them to cooperate with States of their own choice. It was also objected that the concepts of equity, non-discrimination and timely access of all States to the knowledge and applications derived from outer space activities was unclear as to the nature of the duties being imposed through those concepts. It was also said that the idea of no reciprocity on the part of developing countries benefiting from special treatment and preference was inconsistent with the concept of cooperation based on a mutuality of interests among all States.

It is interesting to note that there were only few minor comments regarding principle IV of the draft resolution, which declared that international cooperation in the utilization and exploration of outer space should be exclusively for peaceful purposes and that States providing or benefiting from such cooperation should ensure that space applications are used exclusively for peaceful purposes.

Similarly principle V, which deals with the need to pay attention to all aspects related to the protection and preservation of the outer space environment, especially those potentially affecting the Earth's environment, did not initiate a more substantive discussion in the Working Group. However, this subject was addressed in several interventions at the level of the Subcommittee, as will be mentioned later.

One comment expressed during this discussion should be specifically recalled. The delegation of Germany suggested that it might be useful, if model contracts or draft guidelines for international cooperation in respect of outer space matters were elaborated by the Legal Subcommittee or in the COPUOS. This view was supported by some delegations from both the developed and developing countries who said that

that idea could be considered in the context of a future revision of the working paper of the nine countries.[4]

As already recalled, a number of delegations brought to the attention of the Subcommittee the evidence drawn from many studies and reports published in recent years about the need for protecting the space environment against pollution of any kind and particularly against the generation of space debris. The delegation of Czechoslovakia emphasized in this context[5] that the definition of the item under consideration permitted discussions of all aspects relating to this topic. It was also recalled that this initiative was in full conformity with General Assembly resolutions 45/72 of 11 December 1990 and 46/45 of 9 December 1991, in which it was recommended in identical terms that more attention should be paid to all aspects related to the protection and the preservation of the outer space environment, especially those potentially affecting the Earth's environment. In resolution 46/45 the General Assemble also considered that space debris could be an appropiate subject for in-depth discussion by the COPUOS in the future. The problem of space debris had also its legal aspects which were already discussed in greater detail at different non-governmental fora, such as the ILA Space Law Committee and the IISL. It was the opinion of several delegations that the Legal Subcommittee should be aware of these problems and should be ready to assist the COPUOS and its Scientific and Technical Subcommittee as and when they start discussing these problems, hopefully in a not too distant future.

Though this and other similar opinions on the topic of space environment and space debris were not opposed, the Subcommittee did not adopt any recommendation concerning this issue.

2. Draft Principles Relevant to the Use of Nuclear Power Sources in Outer Space

This particular item was giving rise to optimistic forecasts for several reasons. First, the elaboration of draft Principles relevant to the use of NPS in outer space has reached an advanced degree, many principles having been already agreed upon.[6] Second, the COPUOS recommended, and the General Assembly in its resolution 46/45 of 9 December 1991 endorsed this recommendation, that the Legal Subcommittee, at its thirty-first session, should continue the elaboration of these principles "with the aim of finalizing the draft set of Principles at its next session." Third, the

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4 *See* UN. Doc.A/AC.105/C.2/L.190/Add.2 of 2 April 1992, para.43.

5 *See* the statement of this delegation as reflected in Summary Record of the 553rd Meeting of the Legal Subcommittee of the COPUOS held on 26 March 1992, at 10.30 a.m., UN Doc. A/AC.105/C.2/SR.553, pp. 9-10.

6 As to the state of elaboration of these Principles prior to the 1992 session of the Legal Subcommittee, see Vladimir Kopal, *The Use of Nuclear Power Sources in Outer Space: A New Set of United Nations Principles?*, 19 J.SPACE L. 103-122 (1991).

subject of use of NPS has been under consideration also in the Scientific and Technical Subcommittee and at its Twenty-ninth session held shortly before the session of the Legal Subcommittee some further progress was made, aiming particularly at removing concerns regarding the scope of applicability of the draft Principles.[7] And fourth, the year 1992, which had been designated by the General Assembly in its resolution 44/46 of. 8 December 1989 as International Space Year, has been an excellent opportunity for a meaningful contribution also in the field of progressive development of space law.

For this purpose, the delegations of Canada and Germany submitted a new revision of their working paper,[8] which contained a composite text of draft principles already agreed upon (principles 1,3,5,6,7,8,9 and 10) and of those not yet agreed upon (preamble and draft principles 1A, 4 and 12).[9] Upon the suggestion of the Chairman of the Working Group on NPS, the representative of Austria *Dr.Franz Cede*, it was agreed upon to proceed on the basis of this working paper.

The discussions in the Working Group and informal consultations, which were also held on bilateral bases, concentrated first on the problem of the scope of applicability of the Principles and on the review of this document once it is adopted with regard to changing conditions in this rapidly developing technology. It was intended to solve the former problem by including in the text of the preamble a paragraph affirming that this set of Principles should only apply to NPS devoted to generation of electric power on board space objects. A contrario, it would mean that these Principles do not apply to NPS serving any other purposes, including nuclear propulsion systems for use outside the atmosphere and some other uses of NPS. While the first part of this preambular paragraph, which was elaborated already during the foregoing session of the Scientific and Technical Subcommittee, seemed to be acceptable to all delegations, the second part of the suggested text, which limited the application of the Principles to those NPS which would have characteristics generally comparable to those of systems used and missions performed at the time of the adoption of the Principles, was less acceptable, for it would exclude any major technical innovations from the sway of the document.

On the other hand, the delegation of Mexico requested to include another preambular paragraph, affirming that the use of NPS in outer space should be carried out in accordance with article IV of the 1967 Outer Space Treaty. This suggestion, however, was opposed by some delegations with reference to the fact that the agreed principle 1 already declared the applicability of international law, including in particular the UN Charter

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7 *See* Report of the Scientific and Technical Subcommittee on the Work of its Twenty-ninth Session, UN Doc. A/AC.105/513 of 10 March 1992, pp. 14-15 and Annex III, pp. 35-36.

8 *See* UN Doc. A/AC.105/C/2/L.154/Rev.11 of 16 March 1992.

9 During the earlier stages of discussions, it was also agreed to leave out former principle 11 and to try to amalgamate principle 2 with principle 4.

and the 1967 Outer Space Treaty as a whole. The delegation of Mexico retained its proposal, but expressed its readiness to withdraw it, once agreement on the rest of the set of the Principles was achieved.

In conjunction with the draft preamble, the text of principle 12 dealing with revision of the set of Principles to take place some time after their adoption was considered. Some delegations insisted on shortening the time-period for such a revision (originally "no later then ten years") with regard to the rapidity of scientific and technological changes in the area of nuclear power. They also believed that a shorter time-frame for revision would enable the taking into account of new recommendations of the International Commission on Radiological Protection (ICRP).

The new text as drafted by the Chairman of the Working Group therefore suggests that the NPS Principles shall be reviewed by the COPUOS "no later than two years after their adoption".[10]

Moreover, some delegations, mostly from the advanced countries, felt that with regard to these expected developments, the subject of NPS should remain on the agenda of the COPUOS and both its Subcommittees even after the adoption of the present draft set of Principles.

While most of the attention of the Working Group on NPS at this session was attached to the text of the preamble and principle 12, the other couple of principles, namely principle 1A dealing with "Use of terms", and principle 4 dealing with "Safety assessment", were less discussed, at least at the level of the formal meetings of the Working Group. Nevertheless, some interesting suggestions were advanced also regarding these provisions.

The basic text included in the Canadian-German document brought under principle 1A a rather complicated definition stating that the "launching State" or "State launching" should mean the State on whose registry a space object was carried in accordance with the 1975 Registration Convention; if the object should not be registered, these terms would mean "the State which exercises jurisdiction and control over such space object." For the purpose of principle 9, however, the definition of the term "launching State" as contained in that principle would be applicable.[11]

It was argued against this wording that it could lead to a conclusion that one State, not necessarily familiar with the different systems involved, would have to conduct a comprehensive safety assessment on all of them. While it was desirable that one State would coordinate this task, it was not considered as advisable that a principle would determine beforehand which one of the States involved in the launching of a space object with NPS would assume this responsibility, since this should be a decision to be taken by the parties involved in the launching. Moreover, it was also insisted by some participants in the debate that the question of prior notification should be more adequately addressed in principle 4.

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10 *See* UN. Doc.A/AC.105/C.2/L.190/Add.6 of 7 April 1992, para.18.

11 *See* UN Doc. A/AC.105/C.2/L.154/Rev.11 of 16 March 1992, pp.2 and 5.

During the discussion on this issue, the idea of *Professor S. Gorove* from the University of Mississippi, USA, as published in his recent paper commenting the thirtieth session of the Legal Subcommittee of the COPUOS, was brought to the attention of the Working Group. According to this writer, "one way out of the dilemma, might be to abandon any reference to the "launching State" or "State launching" in principles 3,4,5 and 7 and substitute the phrase "the State which exercises jurisdiction and control over the space object with nuclear power source on board."[12] Recalling this idea, the delegation of Czechoslovakia made the following suggestions:

As a definition, only the following sentence should be included in principle 1A: "For the purposes of these Principles, the term 'State of jurisdiction' means the State which will exercise jurisdiction and control over a space object in accordance with article VIII of the 1967 Outer Space Treaty." Then in principles 3, 5, and 7 the phrase "the State of jurisdiction over a space object" should be used. And the relevent paragraph of principle 4 dealing with "Safety assessment" should read as follows:

"The State of jurisdiction over the space object with an NPS on board shall conduct, where relevant, together with the State from whose territory or facility the space object will be launched and in cooperation with those which have designed and constructed the NPS on board, a thorough and comprehensive safety assessment prior to each launch. This assessment shall respect the guidelines and criteria for safe use contained in principle 3."

A similar approach emphasizing the role of "the State which exercises jurisdiction and control over a space object with NPS on board" was also advanced by the delegation of China, and to a certain extent by the delegation of France which, however, insisted on adding the words "at the time of launch," thus assigning the jurisdiction and control to the State from whose territory or facility a space object would be launched.

From informal consultations on these and other suggestions another "working non-paper" emerged, which reflected the Chairman's views of the result of these discussions.[13] As the previous text relating to preamble and principle 12, the text concerning draft principle 1A and draft principle 4 could in the Chairman's view provide a good basis for reaching consensus on these principles "in the very near future."

According to the wording of principle 1A of this text, the terms "Launching State" and "State launching" mean the State which exercises jurisdiction and control over a space object with NPS on board at a given point in time relevant to the principle concerned. For the purpose of principle 9, the definition of the term "Launching state" as contained in that principle is applicable.

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12 *See* Stephen Gorove, *Thirtieth Session of the Legal Subcommittee of COPUOS - Chances for Progress and Some Thoughts for Possible Consideration*, 34 PROC. COLLOQ. L. OUTER SPACE 376 (1992).

13 *See* UN Doc. A/AC.105/C.2/L.190/Add.6, para. 19.

Moreover, in para. 3 of this definitional principle, a number of rather technical terms, mostly used in principle 3 dealing with guidelines and criteria for safe use, are newly added, such as the term "foreseeable", the term "general concept of defense-in-depth," or the term "made critical". The definitions in this new paragraph have to meet the requirements set up in the US working paper submitted in 1991.[14]

The crucial point of the application of this definition in principle 4 is solved in the Chairman's "working non-paper" by the following phrase: "A launching State, as defined in principle 1A, paragraph 1, at the time of launch shall, prior to the launch, through cooperative arrangements, where relevant, with those which have designed, constructed, or manufactured the NPS, or will operate the space object, or from whose territory or facility such an object will be launched, ensure that a thorough and comprehensive safety assessment is conducted. This assessment shall cover as well all relevant phases of the mission and shall deal with all systems involved, including the means of launching, the space platform, the NPS and its equipment, and the means of control and communication between ground and space."

This text of paragraph 1 of principle 4, however, is rather overloaded, particularly if we read it in conjunction with the definition of the "launching State" as included in principle 1A. Moreover, from the substantive point of view, such a provision would split the meaning of the term "the State which exercises jurisdiction and control over a space object" in dependence on different phases of the launch and its preparation. This would not be in harmony with article VIII of the 1967 Outer Space Treaty and article II of the 1975 Registration Convention. Finally, since the State of registration would be most probably the first who would be addressed by the claimant State in case of damage caused by this object, this State should also play the leading role in the safety assessment of the space object with NPS for which it would bear responsibility. Of course, this State should act in close cooperation with all other subjects involved and it would certainly seek such a cooperation in its own interest.

In para. 3 of the Chairman"s "working non-paper", the time-factor is solved by imposing a duty to make publicly available "the result of this safety assessment, together with, to the extent feasible, an indication of the approximate intended time-frame of the launch." However, it is not explicitly stated by which of the States participating in the assessment it should be done; it may be only assumed that it would be the State which exercises jurisdiction and control at the time of launch. Furthermore, the UN Secretary-General "shall be informed on how States may obtain such results of the safety assessment as soon as possible prior to the launch."

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14 *See* UN Doc. A/AC.105/C.2/L.185 of 10 April 1991 and Annex, in Report of the Legal Subcommittee on the Work of Its Thirtieth Session (25 March -12 April 1991), UN Doc. A/AC.105/484 of 17 April 1991, Annex IV, pp. 38-43.

This procedure, however, might be rather slow and not ensuring a practical and timely availability of the data requested.

It is to be hoped that these and other inconveniences of the text suggested in the Chairman's "working non-paper" will be still considered before the work on NPS Principles is concluded.

3. Definition and Delimitation of Outer Space and the Character of the Geostationary Orbit

As at the previous session, both elements of this double item were discussed separately.

To the long-standing issue of definition and delimitation of outer space, a new impetus was given this year by the delegation of the Russian Federation which introduced a working paper called "Questions concerning the legal regime for aerospace objects."[15] The submission of this working paper was considered as useful by several delegations who felt that by means of consideration of the question arising from the development of this new kind of vehicle a new light might be given to the old problem the up-to-date consideration of which led to an impasse.

By "aerospace object" the Russian working paper meant "an object which is launched into outer space and which is capable at some stage in its flight of using its aerodynamic properties to remain in airspace for a relatively long period." Further in this paper, a basic question was put, whether the regime applicable to the flight of such an object differed according to whether it is located in airspace or outer space. While this question was answered in the affirmative, a number of more specific questions relating to this subject, which were pointed out in the document, were not answered in order to enable an exchange of views.

During the discussion, in which many delegations took part, a number of interesting observations were made. Thus, *e.g.*, the representative of China held the view that there were two types of vehicles which could fall within the category of aerospace objects. The first category would include objects which pass through foreign airspace during launch or landing and which enter airspace from the outer space orbit and after the flight in airspace return back to the orbit. The second category would include aerospace planes the main function of which would be to provide transportation between two points on the Earth while passing briefly through outer space. While the first category was considered by the Chinese delegation as space object, and would leave the problem of delimitation intact, airspace planes would require to determine which law - air, space or a new aerospace law - should apply to their flights.

On the other hand, the position was held that while the Russian working paper presented a number of interesting issues, it was not evident that a separate legal regime was required for so called aerospace systems. The discussion on this issue, however, could continue in order to determine

15 *See* UN Doc. A/AC.105/C.2/L.109 of 30 March 1992.

what practical effect a possible special legal regime for aerospace objects would have on the existing regime of outer space envisaged, for example, by the 1968 Rescue Agreement and the 1972 Liability Convention.[16]

The discussion on this subject was described by the Chairman of the Working Group on this item *Mr. E. Zawels,* representative of Argentina, as preliminary, but the Working Group agreed with the Chairman that this approach "could form a suitable basis, among other bases, for future discussions."[17]

The second issue of this item, namely the geostationary orbit, was also discussed in greater detail in this Working Group. The debate developed on the basis of a "working non-paper" submitted by a group of delegations already at the 1991 session of the Legal Subcommittee.[18] This working paper was based on the presumption that the GSO is a limited natural resource and, therefore, must be used in a rational and equitable manner and for the benefit of all mankind, taking into account the special needs of the developing countries. In the following points, an attempt at guaranteeing in practice equitable access to the GSO was made, including the solution of a case where a developed country and a developing country would have equal claims to access to the same orbital position.

It was particularly the latter point which was discussed this year and some additional texts, proposed individually by the delegations of China, Colombia, Indonesia and Pakistan, further developing para. 7 of the "working non-paper," were submitted.

It is interesting to note that some delegations held the view that the Working Group, while discussing the question of the GSO, should also consider the problem of removing non-functioning objects from this orbit. Along the same lines, it was suggested that a code of conduct or certain minimum standards which would regulate the activities of States in the utilization of the GSO should be elaborated; such document should deal, in particular, with the problem of non-functioning space objects and space debris which create risks affecting the equitable utilization of the orbit by all States.

Furthermore, it should be recalled that unlike previous stages of discussions on the GSO when sovereignty claims or preferential rights were advanced by some States on a geographical basis, the present views polarize around two different positions:

1. The GSO is an integral part of outer space possessing the same legal status and characteristics as outer space.

2. While it is no longer disputed that the GSO is an integral part of outer space, in view of its specific characteristics, a special legal regime is

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16 *See* UN Doc. A/AC.105/C.2/L.190/Add.7 of 9 April 1992, paras. 20 and 21.

17 *Id.* para. 23.

18 *See* Report of the Legal Subcommittee on the Work of Its Thirtieth Session (25 March - 12 April 1991), UN Doc. A/AC.105/404 of 17 April 1991, Annex II, para. 12, at pp. 24-25.

necessary, which would take into account special needs of the developing countries.

During the discussion, the observer for the ITU presented a statement on the work done by this specialized agency with regard to the GSO, in which he also informed about new definitions of Geosynchronous Satellite, Geostationary Satellite and Geostationary-Satellite Orbit, as included in the latest version of the ITU Radio Regulations.[19] He also answered a number of questions relating to the issue whether the provisions contained in para. 7 of the "working non-paper" are in harmony with the relevant instruments of the ITU.

It may be expected that a new document, official or unofficial, reflecting the results of the discussion will be submitted by interested delegations at the next session of the Subcommittee where the Working Group would continue discussing this subject.

Pursuant to para. 11 of General Assembly resolution 46/190, the Chairman of the Subcommittee held informal consultations for the purpose of further improving the utilization of conference servicing resources by this body. A number of recommendations emerged from these consultations, particularly the reduction of the number of plenary meetings in favor of the meetings of the relevant Working Groups, in which substantive discussions on the agenda items develop more productively.

In addition to the brief assessment already suggested in the beginning of this contribution, it may be concluded that during the 1992 session of the Legal Subcommittee some new problems emerged which are important for a further development of the space law doctrine, such as the need for analyzing the terms of "launching State" and "jurisdiction and control over a space object." Also, the need for elaboration of the legal status of space vehicles in connection with the development of aerospace systems has become evident. On the other hand, clear and exact answers to these problems by the space law doctrine might serve the negotiations in the COPUOS and its Legal Subcommittee which could apply more conceptual approaches to the items on their agendas when endeavoring to progressively develop the international law of outer space.

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Legal Protection of Satellite Remote Sensing Data in Europe

The European International Space Year Conference with the Theme "Space in the Service of the Changing Earth" was held last March in Munich, Germany. The Conference which was the official opening of the ISY in

19 These definitions (No. 180, 181 and 182 - WARC-92) are quoted in UN Doc. A/AC.105/C.2/L.190/Add.8 of 9 April 1992, para. 38, at p. 6.

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Europe, was jointly organized by the Commisssion of the European Communities (CEC), the European Space Agency (ESA) and the German Space Agency (DARA) and supported by the European Association for the International Space Year (EURISY). At the conference which was attended by some 1250 participants more than 600 papers were presented which were the results of research to global climate change, monitoring of the environment and the role satellites play. There was one legal session which was jointly organized by the International Institute of Space Law (IISL) and the European Centre for Space Law (ECSL). This session was on the "Legal Aspects of the Use of Satellite Remote Sensing Data in Europe" on which will be reported hereunder.

The Sesssion was opened by the Chairman, *Mr. Thiebaut* of the Legal Affairs Department of the ESA. *Mr. Thiebaut* described the actual developments in satellite remote sensing, the different projects which are being carried out at this moment and the projects which are foreseen for the near future. *Mr. Thiebaut* stressed the importance of international cooperation and the number of exchange agreements which have been concluded by, for example, ESA, to facilitate reception of ERS data by ground stations outside ESA Member States. The problem, however, is that according to *Mr. Thiebaut* a proper regulatory framework is missing with regard to the protection of these data. The consequence can be that although a continuity of satellites gathering data on the earth environment is assured, the ground segment, the distribution and the value adding of the data will not develop along the same lines. Therefore, it is necessary to clarify the legal qualification of the data. *Mr. Thiebaut* ended his opening speech by expressing the hope that this session could provide some clarification of the issues.

The first presentation was given by *Dr. Thiem* of EUMETSAT. He described the recent developments which affect the practice of exchange of data. According to *Dr. Thiem* three factors can be distinguished causing this change of practice. The first development is that the nature of the observance has changed. Data which a few years ago were used only for regional or even nationally oriented weather forecasts are now used for forecasting on a more global basis. The second development is that due to cost reasons (for research and operations), European States have to share resources in specific fields. The examples are the European Centre for Medium Range Weather Forecasts and EUMETSAT. The third development is that there is a growing tendency towards commercial meteorological activities both in the public and private sectors. After describing the different classes of users in the EUMETSAT system, *Dr. Thiem* addressed the EUMETSAT policy on the legal protection of its data. In the EUMETSAT Council an amendment of the Convention was agreed to by its members (not ratified yet) where the exclusive ownership of EUMETSAT over its data is provided.

At this moment EUMETSAT claims copyright over its data. This copyright is based on the national legislations of its member countries and raises problems with the various interpretations of the laws. The processed meteorological data, which according to many experts can be

compared with photos, create various questions under the national doctrines with regard to protection. For example in Germany, there is no need for a creative element for protection of photos whereas in France and the UK some creativity is needed. This requirement raises problems because the EUMETSAT data are obtained and created automatically. After analyzing the different possibilities of protection of the three national legal regimes, *Dr. Thiem* concluded that there is no clear and easy answer to the question of what the legality of copyright is and that this question remains an important issed to be solved in the future.

The second speaker *Mr. Defresne*, legal advisor of SPOT Image, described the SPOT practice of protecting its data. Although not going into detail, *Mr. Defresne* stated that SPOT data are falling under the French law and are protected by Copyright. He also stated that SPOT Image as a French company did not see many difficulties for the protection of its data and that the copyright claim of SPOT had bever been contested before Court until now.

Mr. Ferrazzani of ESA's Legal Affairs Department described the ESA data policy especially with regard to the ERS-1 data. The data policy is based on two fundamental legal principles: the first is to facilitate the widest availability of data to all interested users on an open and non-discriminatory basis according to the UNGA Principles relating to Remote Sensing, and the second is to have ownership over the remote sensing data identified as the result of the sensors on board the satellite along with its processed and derived products. By this practice the ERS-1 data policy has established a precedent in term of a European legal policy for earth observation data. The practice is that copyright is applied on each unit of raw data distributed under the agreements ESA has concluded. This application of copyright has the advantage of enabling a broad protection scheme of the data at the moment of distribution and a better control by ESA over the distribution of the data in order to secure the wide availability of the data. ESA has given access to the data by issuing non-exclusive licenses to the requesters. Finally, *Mr. Ferrazzani* stated that the establishment of a legal policy based on the concepts of ownership, copyright and license offers the best chance for the economic development of this space application.

The U.S. data policy was explained by *Mrs. Shaffer* of NASA. The U.S. position is quite different from what was stated by the previous speakers about European data policy. In the U.S., the government is prohibited from copyrighting data generated at public expense. The systems actually operating in the U.S. are all public systems which means that in practice no copyright is applied in the U.S. *Mrs. Shaffer* further described the different operational and research programs in the U.S. and the way data are distributed. In the U.S. there is not a legal basis for a multi-tiered or market based pricing policy to the enforced if one were imposed. For future Landsat data distribution and data gathered by experimental satellites only marginal costs may be demanded to ensure that the non-commercial use of these data are supported. The legal framework is not extensive and is under active consideration and revision

at present. The scientific and operational requirements of the governments and the international community are the main factors for defining data policy approaches and resulting legal structures. According to *Mrs. Shaffer*, the tendency in the U.S. is to regard the publicly funded data as a public good to be shared, and not as an economic resource to be protected. This means that the legal structure will be less critical to the success of the data policy of the U.S.

Prof. Gaudrat, speaking on the research actually carried out by a team under his direction for the Commission of the European Communities, described the main issues of the study. The research "conditions of access to earth observation data" which had just been started will look at the legal protection of raw and processed data in the Community Member States. The study will analyze the different protection schemes for satellite remote sensing data in Europe and a review of the European national provisions applicable to remote sensing data will be made. Also the way the UKN principles play a role in the contract practice of the remote sensing operators will be analyzed. The aim of the study is to take an inventory of the actual practice of the European Community States with regard to the protection of satellite data and identifying steps to harmonize and eventually complement these schemes. For this last step, the policy of the U.S. and Japan will also be taken into account. As the study had just started *Prof. Gaudrat* could only give these general outlines and aims. A first interim report analyzing the way raw data are protected in Europe can be expected before summer.

The position of the users of remote sensing data was discussed by *Mr. Cornaert*, deputy-head of the task force to establish the European Environmental Agency (EEA), and *Mr. Tokumaro* of the Earth Sciences Division of UNESCO. *Mr. Cornaert* stated that from his point of view the legal requirements for the users are very simple. The regulation should be simple, enabling the users to acquire data at the lowest possible costs. The fear was expressed that the discussion which was held at the Session could only lead to more complex regulations which would at the end inhibit the widest possible use of the data.

Mr. Tokumaro stated that he would try to represent the data user or future data user especially those from the developing countries. *Mr. Tokumaro* explained the term "data user," which is the receiver of the processed data (Produced by the remote sensing satellite operator) and the interpreter of the data so that the information is analyzed. The data user's role is essential because the primary and processed data - just rough digital and statistical information from the earth's surface on sun reflectance or heat emission - are meaningless without analysis.

The number of data users is increasing and they are ready to process a huge amount of satellite data at higher speed than ever. The problem is that they need to have access to the data itself. For example, UNESCO is proposing the concept of a Satellite Data Centre which should provide a remote sensing intra-structure for countries which do not have direct receiving stations for SPOT/LANDSAT satellites. In principle, it should have the form of a national data base which will constantly be

updated with new (satellite) data and which should establish a national library.

Mr. Tokumaro then addressed the protection of the data and emphasized that the utilization of remote sensing technology started quite recently and that data users had scarce opportunities to express their interests publicly. In addition, both the provider and the user of the data have mutual interests in data concerning natural disasters, the environment and the rational use of the earth's resources. An important aspect for *Mr. Tokumaro* was the archiving of data which must be considered as a kind of world heritage. Ways should be sought to protect the archives as has been done by the "Convention Concerning the Protection of the World Cultural and Natural Heritage," which was adopted by the UNESCO General Conference in 1972. With regard to the access to data, *Mr. Tokumaro* stated that this should be arranged acccording to UN principles. He also stated that the recent policy change of the U.S. and CEOS, where data should be supplied at "marginal costs" of reproduction for public and non-profit use, will be widely appreciated by the users. With regard to the copyright claims of the Satellite remote sensing operators, it is questionable whether this claim can be held. In case the claims are confirmed the users should be informed explicitly in the conditions for sale how to get authorization for reproduction and which fees have to be paid. Otherwise, data users, sometimes very far located from the operators, have no chance to understand the proper operation of the copyright rules. Finally *Mr. Tokumaro* invited ECSL and IISL to make contact with UNESCO as the administrator of the Universal Copyright Convention to study the copyrightability of these data.

The last speaker of the session was *Dr. Dreier* of the Max Planck Institute in Munich who gave an analysis of the legal deficiencies of the existing protection of satellite's remote sensing data and his ideas to achieve an effective protection on the international level. First, he analyzed the applicability of trade secret protection and patent law which both are not suitable for protection of satellite remote sensing data. Then he described copyright protection and the Berne Convention which, according to *Mr. Dreier,* would raise many difficulties in practice also because it is clear that the members of the Convention do not have, or probably will not have, a consensus whether remote sensing data should fall under the protection of the Convention. For raw data, some more problems arise related to the originality criterion as was also discussed by *Dr. Thiem.* When compared with the protection of photographs, the point of fixation at which the protection would attach will not be clear.

A more fundamental problem related to the applicability of copyright is that under the concept of copyright the information is free and the visualization is protected. However, a definition of information is not given, and as a result the digitized information is only protected when a visualization has preceded it.

For future regimes regulating the protection of satellite remote sensing data, *Mr. Dreier* stated that the system of intellectual property protection needs at least some amendments in order to protect effectively

the activities in the field of remote sensing. It does not matter whether copyright protection will be adopted or not and it also does not make a difference whether a regime will be implemented as a protection sui-generis or as a neighbouring right.

The question as to which forum would be appropriate to take the necessary decisions and implement the changes was finally addressed by *Mr. Dreier*. He suggested that a solution to the protection problem has to work from the national level, simultaneously in several countries. Similar or identical national legislation would be a first step toward harmonization. The lack of international treatment would then have to be overcome by concluding a net of reciprocal agreements, which in turn may serve as the nucleus for a regional of international treaty protecting remote sensing satellite data.

The conclusion of the session is that the protection of remote sensing data forms is indeed a problem in Europe. Whether this unclear situation should lead to additional legislation, either on a National or European scale, is uncertain. Also, an eventual choice for copyright protection could pose problems with regard to cooperation with the United States and others. Whatever the outcome of the legal debate is, it is an interesting development in that space law is getting more involved with practical problems and therefore is mixing with existing national regulations applicable to the specific space application. This certainly is an interesting prospect for space lawyers.

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The Missile Technology Control Regime and Space Launch Vehicles: An Update

During the mid-1980's, the proliferation of sophisticated weapons systems to less developed nations became a matter of concern among many Western governments. In response to these growing concerns, the seven Western industrialized nations that comprise the "Group of Seven" economic allies began classified discussions and diplomatic efforts.[1] These efforts culminated in April 1987 with the joint announcement of a

1 NATIONAL ACADEMY OF SCIENCES, FINDING COMMON GROUND: U.S. EXPORT CONTROLS IN A CHANGED GLOBAL ENVIRONMENT 70 (1991) [hereinafter FINDING COMMON GROUND].

coordinated policy towards missile non-proliferation.[2] This policy arrangement, the Missile Technology Control Regime (hereinafter "Missile Tech Regime"), took the form of unilateral regulations coordinated by an overall policy arrangement, rather than being formalized in the sense of a treaty or document. The Missile Tech Regime is a loose affiliation of like-minded nations, dedicated to ensuring as much uniformity as possible in their individual regulations governing missile non-proliferation. Since 1987, the Regime has expanded to include eight more nations as formal adherents.[3]

Undoubtedly, direct correlations exist between the development of space boosters and missile systems in those Third World nations that seek both space capabilities and an extended means to smite their adversaries. Unfortunately, in the latter case, the acquisition of ballistic missiles is frequently also linked with the attempt to develop nuclear or chemical weapons of mass destruction. Iraq's program is now perhaps the best-known example.

Not only is the nature of space launch vehicles and ballistic missiles a historic bond, but obviously the technology needed to build, guide and launch such vehicles is practically identical.

Recognizing that dual uses are implicit in many developing nations' rocketry programs, the planners of the Missile Tech Regime chose not to restrict technology transfers on all rockets with potential military applications. Instead, the focus of the Regime and its guidelines is upon nuclear capable delivery systems, as opposed to "raw materials and technology needed to produce a nuclear bomb" that are addressed by other plans and treaties. In fact, space launch vehicles are specifically encompassed within the Missile Tech Regime. Category I of the Region consists of rockets, ballistic and cruise missiles that may exceed ranges greater than 190 miles and payloads of more than 1100 pounds (300 kilometers/500 kilograms). Category I also encompasses individual rocket

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2 Agreement on Guidelines for the Transfer of Equipment and Technology Related to Missiles, Apr. 16, 1987, 26 I.L.M. 599 [hereinafter Agreement] (original adherent nations were Canada, France, West Germany, Italy, Japan, the United Kingdom, and the United States. Newest adherents include Australia, Belgium, Denmark, Luxembourg, the Netherlands, New Zealand, Norway and Spain; while not formally adhering to the Regime, Sweden is one nation that is modifying its existing export controls to comport with the Regime's precepts). Both the People's Republic of China and the former Soviet Union have been urged to join or affiliate with the Regime. Before its demise, the Soviet government had indicated its willingness to abide by the Regime, as did the Chinese. *See* LEONARD S. SPECTOR, NUCLEAR AMBITIONS; THE SPREAD OF NUCLEAR WEAPONS 1989-1990 300 (1990). While the late Soviet government generally complied with the Regime, recent Chinese efforts to sell missiles to Syria and Pakistan in 1991 and 1992 make China's statements of acceptance questionable at best. *See China's Eager Missile Merchants,* TIME, Apr. 15, 1991, at 17.

3 Richard H. Speier, *The Missile Technology Control Regime,* in CHEMICAL WEAPONS AND MISSILE PROLIFERATION: WITH IMPLICATIONS FOR THE ASIA/PACIFIC REGION 119 (Trevor Findlay ed. 1991).

stages, reentry vehicles, rocket engines, guidance sets, and thrust vector controls. A second list, Category II, enumerates various other commodities that, as a general rule would be subject to more flexibility in licensing.[4] In addition to the criteria concerning Categories I and II, the Regime's guidelines specify five factors as to whether a technology transfer may violate the Regime.[5]

In a fact sheet accompanying the public announcement of its adherence to the Missile Tech Regime, the United States government stated that the Regime is "not designed to impede national space programs or international cooperation in such programs as long as such programs could not contribute to nuclear weapons delivery systems."[6] However, due to the dual-use conundrum, one of the Regime's American architects noted that it "makes no exceptions for so-called peaceful vehicles, alleged to be for military purposes other than weapons delivery, or vehicles sought by nations that do not currently have nuclear weapons programs. . . . The drafters of the [Regime] were careful to focus its controls on large missiles and rockets but to permit continued international cooperation in the peaceful uses of space (that is, satellites and the information they handle, as opposed to launch vehicles). . . ."[7] These statements lead to paradoxical results. First, it is difficult to see how such a blanket export ban on space launch vehicles could not help but jeopardize national or international space programs. The satellites and space vehicles that are not governed by the Regime must have been placed into orbit by some means! Second, the policy banning export of space launch vehicles to all nations regardless of their nuclear ambitions seems to run contrary to the intent of the Regime's five-factor methodology. Perhaps, however, this approach recognizes that today's friend may be tomorrow's adversary. As one justification for a hard-line approach to space technology transfers, it may at least make sense by providing a measure of predictability and consistency in export licensing.

As a Missile Tech Regime adherent, the United States has sought to implement its goals and criteria primarily through regulations promulgated by the Commerce Department's Bureau of Export

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4 Agreement, *supra* note 2, at 599-602. However, it should be pointed out that under the Commerce Department's revisions to the Commodity Control List, 15 C.F.R. §778.7, twenty-five export commodities numbers, or ECCNs, that are listed under Category II are now restricted to a validated license, as opposed to less stringent special licenses. For each of these items, individual validated licenses are now required before they can be exported.

5 *See* Agreement, *supra* note 2, at 600-01.

6 *Id.* at 600.

7 Speier, *supra* note 3, at 116-17.

Administration (BXA).[8] In the wake of European and American exports to Iraq of many sensitive technologies used to upgrade Iraqi missile capabilities before the 1991 Gulf War, the Commerce Department has recently promulgated new regulations under the so-called Enhanced Proliferation Control Initiative (EPCI).[9]

Besides imposing greater licensing restrictions upon certain Category II items that generally had received less scrutiny than Category I items, the EPCI regulations implement the "projects of special concern" focus that is unique to the Regime. The most stringent forms of licensing, individual validated licenses, are required when an exporter "knows" or is informed by BXA that an item is either destined for such a project or for use by a country where a project of special concern is listed, regardless if it is destined for that specific project. This "knowing" standard imposes a much heavier burden upon exporters than has been previously imposed in American export licensing. Moreover, specific provisions forbid United States "persons" (individuals or corporate entities) from aiding in the design, development, production or use of ballistic missiles. The EPCI proposals do not specifically exempt space launch vehicles from the Regime's definition of "missiles." However, the specificity of its standards listing "projects of special concern" and countries engaged in missile acquisition may tacitly counterbalance what appears to be the Regime's blanket prohibition of transfers on space launch vehicles.

Whether or not it can halt all missile technology transfers, the Missile Tech Regime has still achieved some notable successes in its four-year history. One Argentine program involving several large European companies, Iraq and Egypt was finally halted in 1990, amid mounting diplomatic pressure, scheduling breakdowns, financial shortfalls and technical difficulties attributed in large part to the Regime's efforts. India's Agni program and Brazil's Avibras programs, likewise, have been

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8 *See* 15 C.F.R. §§ 776.18, 779, Supp. 4 (1990) (specifying case-by-case determinations for export commodities relating to missile proliferation). *See also* FINDING COMMON GROUND, *supra* note 1, at 84-85 (where a planned export has a missile-related usage, license applications are referred to an interagency Missile Technology Export Control Group for approval or denial).

9 56 Fed. Reg. 40,494 - 40,502 (1991). Recent legislation has also been proposed to reauthorize the Export Administration Act, 50 U.S.C.A. app. §2414 (West 1991), which includes specific sanctions against individuals and companies who violate missile-related export licensing controls. S.320, 102nd Cong., 1st Sess. (1991). At last report, the House had referred S.320 back to the Senate on October 31, 1991. LEXIS, Legis Library, BLTRCK File.

10 *See* 56 Fed. Reg. 40,501 (1991) (noting changes to 15 C.F.R. §778, Supp. 6, that will list the "projects of special concern" to the Regime's adherent nations).

11 56 Fed. Reg. 40,497 (1991) (amending 15 C.F.R. §771.2).

12 56 Fed. Reg. 40,500 (1991) (adding in new Section, 15 C.F.R. §778.9).

effectively hindered by the Regime. Of the seven Indian attempts to launch satellites, only two have succeeded, due to a reliance born of necessity on undependable systems and Iraq's missile production efforts, too, were thwarted in large part by pressure brought to bear on many identified transfers of missile technology and by curbing companies' willingness to engage in such commerce. To at least that degree, the Regime has fulfilled its purpose.

It is a more difficult proposition, however, to put the Missile Tech Regime's impact on space ventures into perspective. The hard-line approach of banning transfers of all space launch vehicles and their most vital components may limit trade in warlike goods, but to what extent does this chill legitimate joint ventures in space technology? The recent EPCI regulations may soften the rigidity of the Regime to some extent, by restricting rocket technology transfers to known or suspected seekers of missile technology, at least as far as United States entities are concerned. Nonetheless, the imposition of a "knowing" standard and the subjection of commercial space technology ventures to lengthy and time-consuming license processing (with little certainty as to license applications' ultimate approval) may deter all but the hardiest from expanding into the field of commercial space lift technology. It may yet drive developing nations to turn only to the existing space flight leaders, such as NASA, ESA, the Japan Space Agency, and whatever may be left of the Soviet program, as their only recourse for space launch options. While closing off options to nations seeking weapons of mass destruction -- surely a positive goal -- the Missile Tech Regime may also have a less positive, short-term effect in closing off entry to the space launch market to new competitors, particularly those in developing countries. Such may be the price paid to ensure that the plowshares of rocket technology are not reforged into the swords of the future.

Jack H. McCall, Jr.[*]

Comments

Outer Space Environmental Pollution: An International Law-Science Update and Comment on "Heavenly Junk"

Both governments and private organizations have been involved in

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space debris studies for more than two decades[1] and have spent millions of dollars, francs and rubles in connection with them. Space debris is both natural (mostly meteoroids and cosmic storms) and man-made (mostly parts of inactive space objects), generated in outer space by break-ups of space objects, spacecraft, payloads, fragments, shrouds, rockets, exhausts, etc. of various sizes down to the size of a fraction of a millimeter. While the space debris problem is not urgent, it is a serious threat to the peaceful utilization by all nations of outer space in low earth orbit, and by the year 2000, it will also endanger the use of the vital geostationary orbit. As a result, composite "shielding" must already be design-engineered for space stations as well as government and commercial satellites, In addition, launch windows will be lost soon.

At present, there are some 700 pieces of space debris larger than 10 cm in size tracked by computers of the U.S. Space Command seven days a week 24 hours a day. These trackable pieces are increasing at the rate of some 300 per year. Non-trackable debris smaller than 4 cm exceeds the trackable debris objects by at least 8 times. Collision velocity is approximately 10 km per second. The increasing seriousness of the space debris situation has been demonstrated recently when the U.S. space shuttle had to take evasive maneuvers twice to avoid being hit by space debris. The 1990 recovered Long Duration Exposure Facility to test space debris is science documented proof of the problem. "Clean" outer space is today essential for treaty verification, national security, and world peace. It is best to take the pragmatic approach to the problem of space debris, and not the alarmist approach as some would do.

What is the current status of international efforts to meet the space debris problem? This question must be answered first by reference to the current international legal situation and, second, by the updated science status of space debris issues.

As to the legal situation, the United Nations does not have space debris on the official agenda of its Committee of the Peaceful Uses of Outer Space (UNCOPUOS). While nuclear power sources are on the U.N. Agenda,[2] there are no outer space treaties as yet that have an official definition of "space debris," or "space object" or even an identification of where "outer space" begins. UNCOPUOS is a logical place to initiate the drafting of a new international space debris treaty similar to other five key U.N. outer space treaties. The next best possible source for a new international space debris treaty or agreement would be the International Telecommunications Union. It has extensive operating international and regional regulatory bodies, rules, regulations, and successful radio spectrum and spatial control procedures in place for outer space. A future I.T.U. Conference

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1 For recent publications, see, for instance, 33 PROC. COLLOQ. OUTER SPACE 152, 165, 186, 206, 356, 379, and 400 (1991); H. A. BAKER, SPACE DEBRIS: LEGAL AND POLICY IMPLICATIONS (1990).

2 Kopal, *Use of Nuclear Power Sources in Outer Space: A New Set of United Nations Principles?* 19 J. SPACE L. 103 (1991).

could move toward drafting an outer space debris agreement if it so desired. The need for such an agreement has been much discussed in many countries at science and legal conventions, in professional publications and at meetings of space lawyers.

There are no existing treaties that expressly deal with space debris, but those indirectly involved include 1967 Outer Space Treaty, the 1972 Liability Convention, 1974 Registration Treaty, the 1969 Rescue and Return Agreement, the Partial Test Ban Treaty, the Non-Proliferation Treaty, and the Environmental Modification Convention, as well as the two 1984 post-Chernobyl treaties. They would have to be kept in mind when drafting a new "space debris" treaty. It is the personal belief of this writer that such a treaty will not be needed until 1995 after the U.N. Working Study Group in the U.N. Outer Space Affairs Division, and the major space powers had time to thoroughly study the overall space debris problems nationally as well as at the U.N. and made legal and scientific recommendations pertaining to it.

By 1993 the U.N. should establish an Outer Space Debris Working Group in its Outer Space Affairs Division, and legal definitional as well as national science and technical debris studies should be completed. Then the road will be clear for the conclusion of a comprehensive space debris treaty in 1995. At that time, this writer plans to recommend to the House of Delegates of the American Bar Association adoption of the following Resolution: "The ABA urges 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 practicable consistent with each nation's national security."

That 1995 would be good timing legally for a new space debris treaty is also shown by the following communication of Vice President Dan Quayle, Chairman of the US National Space Council, at the Whitehouse to this writer on March 22, 1991:

> You raised several questions relating US policy on space debris. It is, of course, an area that requires US government attention. That is why, when we updated the National Space Policy in November, 1989, we stated that "all space sectors will seek to minimize the creation of space debris. . . consistent with mission requirements and cost-effectiveness. And we will encourage other space-faring nations to adopt policies and practices aimed at debris minimization." An outgrowth of this policy is the bilateral agreement we have in place with the Soviet Union to cooperate in this area, and we are discussing cooperative activities with the European Space Agency and others. At the same time, there are international US government coordination activities underway. These are the first of a series

of steps that we must pursue to fully understand the problem and define a desirable course of action. I expect that questions relative to a UN process will not be taken up before then.

In the meantime, there is voluntary compliance by the U.S., Japan, the U.S.S.R. (and now eleven members of the Commonwealth of Independent States), the European Space Agency (twelve countries), and other nations. Voluntary outer space debris preventive action has been U.S. Presidential policy since February, 1989 as it is with other major space powers, excluding China and some others. Article IX of the 1967 Outer Space Treaty is ambiguous as to "harmful contamination," "interference," and "adverse changes in the environment." The 1979 Moon Treaty in Article 7 is stronger, but still only mandatory as to international consultations. The three other international legal instruments which are most helpful, include the Partial Nuclear Test Ban Treaty, the Environmental Modification Convention and the I.T.U. Convention. It is clear that in 1995 a new unambiguous international space debris treaty is necessary.

On the science side no economical, practical, or technical "solution" except preventive measures have yet evolved for the removal from low earth orbit or geostationary orbit of space debris. Laser "zapping" for debris destruction is not really an answer. Shuttle removal is often illegal and surely uneconomical from a cost viewpoint. Scientifically, the current developments may be highlighted as follows:[3]

(1) A summary of the several elements of the space debris environment and the predominate orbits that they affect are: (a) Ultraviolet radiation affects all orbits; (b) Atomic oxygen atoms (ionic oxygen atoms travelling at exceedingly high speed) mainly effect LEO; (c) protons and mostly negative electrons affect middle earth orbit and geostationary orbit. These are mainly from the Van Allen belt; (d) Micrometeroid and natural space debris affect all orbits; (e) Vacuum by corrosion and erosion affects all orbits and all components unless sealed or pressurized. These factors have been proven by several space shuttle flights as to concentration of space debris and hypervelocity particles which have been captured and returned intact. The LDEF experiment by the Shuttle Challenger from April 7, 1984 to recovery by Shuttle Columbia in January, 1990 through its Interplanetary Dust Experiment verified

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3 For details, see Schneider, Kitta, Stilp, Lambert, and Reimerdes, *Micrometeoroid/Debris Protection of the Columbus Pressurized Module*, Doc. IAF-91-280, 42nd IAF Cong. Oct. 5-11, 1991 (Montreal, Canada); Schonberg and Walker, *Composite Material Debris Shielding for Long-Term Space Structures*, Doc. IAF-91-282, *id.*; Maag, *Low Earth Orbit Debris Effects on Materials*, Doc. IAF-91-284, *id.*; Singer, Mulholland, Oliver, and others, *Interplanetary Dust Experiment: Techniques for the Identification and Study of Long-Lived Orbital Debris Clouds*, Doc. IAF-91-285, *id.*; Yelle, *Orbital Debris Shielding Design of the Radarsat Spacecraft*, Doc. IAF-91-0283, *id.*

the impacts of extraterrestrial particles and orbital debris, in 56 experiments. When LDEF returned to certain intersection points in its orbit, it impacted the same debris clouds again and again with dimensions exceeding 2000 km. Such clouds are found in both moderate inclination (35) and high inclination (65) orbits.

(2) The ESA Laboratory Module Columbus which is part of the NASA Space Station Freedom will be protected against both Micrometeroid and space debris impacts.

(3) The Canadian Radarsat, operating as a remote sensing (SAR) satellite in early 1995 and operating in a sun synchronous orbit in the daylight cycle for 5 years at approximately 794 km and inclined some 98, has been modified to improve debris shielding effectiveness as confirmed by NASA Johnson Space Center Hypervelocity Impact Research Lab.

(4) At the 42nd Congress of the IAF in early October, 1991 in Montreal, Canada, there was substantial scientific agreement that composite material debris shielding for long-term space structures like Levlar 49/Cloth or Spectra 900/Epoxy is far more effective than aluminum as shown in both single bumper and dual bumper high speed impact tests.

(5) The U.S. and the Russian Republic should continue and expand official current space debris discussions and meetings.

(6) Consensus is that $E=MV^2$ is the correct space debris formula on a linear not geometric basis.

In conclusion, for the present, both preventive and active measures are the best. These are for minimizing the amount of debris produced; avoiding nonintentional explosions by venting; prohibiting intentional explosions; and removing inactive objects from low earth orbit by atmospheric burn up; or from high orbit by garbage orbit disposal; or possibly by laser destruction action. Of course in the meantime and until 1995 (when a new space debris treaty seems practical), both shielding of space craft and payloads as well as evasive maneuvers are necessary.

The changing world political and economic situation has already vastly improved the flow of information and tended to reduce misunderstandings regarding space debris in scientific and legal meetings. This development will accelerate both the scientific and legal solutions to the space debris problem that affect all, and will affect the earth's future.

Any new space debris treaty in 1995 should follow in its drafting the ten principles of outer space treaty drafting presented at the 1983 Congress of the International Astronautical Federation in Budapest, and

accepted by many nations.[4]

*Edward R. Finch, Jr.**

Case Notes

Disputes Arising out of Space Related Contracts: The Search for Intent

Introduction

The resolution of disputes arising out of space-related contracts often involves efforts to determine the intents of parties at the time these technically complex contracts are entered. This note will focus on the legal issues involved in searching for that intent by making reference to *British Aerospace v. Hughes*,[1] a case involving a patent licensing matter concerning space technology, which case was recently tried in a Los Angeles, California state court. In this examination, the legal issues discussed include the application of the plain meaning rule, the principles of waiver and estoppel, and the general rules of contract construction, as well as the use of extrinsic evidence to show intent. Reference will also be made to some innovative current and future planned space technology and an equally innovative insurance contract designed, with the help of risk assessment studies performed by third parties, to define legal relations, and ultimately intent. Additionally, some recommendations will be made for minimizing the likelihood of protracted space-related contract disputes.

Space-Related Contracts

Contract law in the United States generally requires the existence of certain elements in a contract in order for that contract to be judged valid. The four elements are competent parties, legal subject matter, consideration, and mutual assent. Most contractual disputes arising out of space-related subject matter seem to turn on the mutual assent element. The inquiry generally turns to two questions: "What did the parties originally intend?" and "Was there a meeting of the minds?"

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4 FINCH, MAGNA CARTA OF OUTER SPACE, one page document with 10 points for future outer space legal treaty drafting, presented at the 1983 International Institute of Space Law Colloquium in Budapest and published in the NEW YORK TIMES, the ACTCA ASTRONAUTICA as well as in AERONAUTICS AND ASTRONAUTICS. It was reviewed by the President of the United States and sent to the Vice President on April 10, 1989.

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1 British Aerospace v. Hughes., No. C 682 831 (Cal. Super. Ct. Oct. 5, 1990).

It would seem that there are two major reasons space-related contract disputes arise as often as they do. First, the subject matter is technically complex and exceedingly difficult for most to understand. For example, issues in space insurance contract disputes in some cases can turn on understanding three dimensional motion of satellites in space, or in others on an understanding of the subtleties of how radio signals travel through transponders aboard satellites. Second, the state of the art of space technology advances so quicky that it is difficult for parties drafting contracts to consider all future possibilities. One need only consider that before Sputnik came on the scene in 1957, there were no man-made objects in space; now, there are thousands.

British Aerospace v. Hughes Background

A review of *British Aerospace v. Hughes* will include excerpts from the trial brief prepared by Mendes & Mount for its client, British Aerospace. As previously stated, the case concerned a patent licensing dispute concerning United States' launching of satellites and its resolution required an analysis of the contracting parties' intent.

On December 15, 1965, British Aircraft Corporation (now British Aerospace, "BAe") and the Hughes Aircraft Company ("Hughes") entered into an agreement to collaborate on European scientific satellite projects. At the time, Hughes had already established itself as one of the world's foremost experts on satellite technology, but recognized the need to team up with a European company in order to penetrate the burgeoning European satellite market. BAe also possessed considerable satellite expertise, but recognized the need to align itself with a technological leader in order to be more competitive in that market. A key objective of the collaboration was to win bids for a series of as many as fourteen scientific satellites planned for construction by the European Space Research Organization (ESRO which later became ESA), all but two of which were to be launched from the United States.[2]

After an exchange of four drafts and a number of face to face meetings between executives and lawyers, Hughes and British Aerospace finally reached a collaboration agreement entitled the License and Technical Assistance Agreement ("LTAA"). The LTAA provided for the granting of patent rights, the transfer of technology, and the giving of technical assistance by Hughes in exchange for the payment of royalties by BAe. The principal satellite programs completed under the LTAA, which expired in 1973 but continued in force on programs already in progress, were ones associated with the Cos-B and Geos A & B satellites. These satellites were launched from the United States in 1975, 1977, and 1978, respectively. Royalties exceeding $1.15 million were paid by BAe to Hughes under the terms of the LTAA for those satellites. BAe was unaware

2 Even those two satellites would ultimately have to be launched from the United States because they were earmarked for launch aboard a future European launcher, the development of which was never completed.

of any disagreeement with Hughes over interpretation of the LTAA until November 1975, some ten years after it had expired. By that time, Cos-B had already been launched from the United States, and BAe was contractually committed to the GEOS satellite program, which also involved a United States launch.

Key language, in the LTAA, which formed the basis for the disagreement, is contained in a parenthetical phrase in the grant clause, Article II, Section 1. The grant to BAe reads, in pertinent part:

> [a] nonexclusive, nontransferable right and license (except that no right or license is granted under United States Patents), to use HUGHES Patented Inventions . . . in all countries where HUGHES is not prevented from so doing by any law, regulation, or executive order.

The dispute arose as a result of Hughes' demands on BAe's customers for additional royalties for the three satellites (beyond the $1.15 million already paid), on the basis that the satellites were launched in the United States and Hughes had acquired rights under two U.S. patents for spin stabilization technology, which technology, Hughes alleged, the satellites incorporated. Hughes argued it was entitled to the additional royalties since the LTAA provided for no right or license granted under the United States patents. Both the patents which Hughes was asserting -- the Williams patent and the McLean Reissue patent -- were not in existence at the time the LTTA was signed and, in fact, did not issue until 1970 and 1973, respectively. As a result of the Hughes demands, BAe brought a declaratory judgement action in the Los Angeles, California state court for an interpretation of rights granted under the LTAA.

During discovery in the action, some 34 depositions were taken and thousands of documents were reviewed. At trial, there were live witnesses presented, and hundreds of exhibits received in evidence. Additionally, many depositions were read into the record at the time of trial.

The focus of BAe's case was that the very purpose of the LTAA was to take advantage of the burgeoning European/U.K. satellite market. This purpose necessarily involved launch of satellites from the United States, a fact known by all, including the negotiating parties. BAe also contended that the conduct of both Hughes and itself subsequent to entering into the agreement was consistent with the proposition that once royalties were paid under the agreement, satellites built under its protection could be launched from the United States without further payment of royalties. Finally, BAe claimed that in any event, the post-execution conduct of Hughes estopped it from claiming otherwise.

Hughes' case centered on arguments that the words of the LTAA had a plain meaning and that evidence from the 1965 time frame, primarily in the form of magazine articles, showed optimism that a European launcher would be available to launch satellites covered by the LTAA. Hughes also

claimed laches, arguing that so much time had passed since 1965 and so many changes had taken place, that it was unable to effectively assemble evidence to present its case.

Legal Issues

The following legal issues, and California law underlying those issues, were addressed by the parties in the case and are representative of the types of legal issues that could be expected in almost any type of space-related contract dispute:

1. The reasonable susceptibility of the language of the LTAA to BAe's proffered interpretation, thus, allowing the introduction of extrinsic evidence in the face of Hughes' argument that the offered language has a plain meaning.

(a) Under California law "The test for admissibility of extrinsic evidence to explain the meaning of a written instrument is not whether the agreement appears to the court to be clear and unambiguous on its face, but whether the offered extrinsic evidence is relevant to prove a meaning to which the language of the instrument is reasonably susceptible . . . Accordingly, rational interpretation requires at least a preliminary consideration of all credible evidence offered to prove the intention of the parties . . . Such evidence includes testimony as to the circumstances surrounding the making of the agreement . . . including the object, nature and subject matter of the writing . . . So that the court can place itself in the same situation in which the parties found themselves at the time of contracting."[3]

(b) California law allows a wide variety of extrinsic evidence to prove a meaning to which the language is reasonably susceptible, including extrinsic evidence concerning:
   (1) the object and purpose of the parties,[4]
   (2) context in which the contract arose,[5]
   (3) bargaining history,[6]
   (4) testimony of negotiators,[7] and
   (5) post execution conduct of the parties,[8]

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3 Pacific Gas & Electric v. G. W. Thomas Drayage, 69 Cal. 2d 33, 37-40 (1968).

4 Isenberg v. Salyer, 62 Cal. App. 2d 938, 941-42 (1944).

5 Medical Operations Management, Inc. v. National Health Labs, 176 Cal. App. 3d. 886, 892-3 (1986).

6 Warehousemen's Health and Welfare Fund v. IT Corp., 524 F. Supp. 96, 97 (D. Cal. 1981).

7 Heston v. Farmer's Ins. Group, 160 Cal. App. 3d 402, 412 (1984).

8 Salton Bay Marina, Inc. v. Imperial Irrigation Dist., 172 Cal. App. 3d 914, 933 (1985).

2. The implied rights of BAe and its customers to launch satellites from the United States, without payment of a second royalty.

California law provides that the rules controlling the exercise of judicial authority to insert implied covenants into contracts are:

(1) [T]he implication must arise from the language used or it must be indispensible to effectuate the intention of the parties;
(2) it must appear from the language used that it was so clearly within the contemplation of the parties that they deemed it unnecessary to express it;
(3) implied covenants can only be justified on grounds of legal necessity;
(4) a promise can be implied only where it may be rightfully assumed that it would have been made if attention had been called to it; and
(5) there can be no implied covenant where the subject is completely covered by the contract.[9]

3. The issue of estoppel of Hughes as it relates to Hughes' claim that the LTAA permits a second royalty for the launch of the satellites from the United States.

California law provides that the four elements required for a finding of equitable estoppel are:

(1) the party to be estopped must be apprised of the facts;
(2) he must intend that his conduct shall be acted upon, or must so act that the party asserting the estoppel had a right to believe it was so intended;
(3) the other party must be ignorant of the true state of facts; and
(4) he must rely upon the conduct to his injury.[10]

4. The effect of the rules of contract construction on interpretation of the LTAA.

The rules of contract construction in California are as follows:

(1) The language of a contract should be construed against the party who drafted it,[11]
(2) A contract must be interpreted so as to make it lawful and capable of being carried into effect,[12]

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9 Addiego v. Hill, 238 Cal. App. 2d 842, 848 (1965).
10 City of Long Beach v. Mansell, 3 Cal. 3d 462, 489 (1970).
11 See e.g., Victoria v. Superior Court, 40 Cal. 3d 734, 745 (1985).
12 Cal. Civ. Code, § 1643 (West 1979); Restatement (Second) of Contracts § 203 (a) (1981).

(3) Words in a contract which are wholly inconsistent with its nature, or with the main intention of the parties are to be rejected,[13]

(4) The whole of a contract should be taken together, so as to give effect to every part and particular words or clauses must be subordinated to general intent,[14] and

(5) When language of a contract is ambiguous it must not be given an interpretation which would involve an absurdity.[15]

The Court's Decision

After a five week trial, the court decided that BAe and its customers did indeed have the right to launch satellites in the United States, without the payment of royalties over and above those already paid. The trial judge found, on Otober 5, 1990, in pertinent part, as follows:

> On balance, the court believes the evidence favors BAC's interpretation of the LTAA. First, the only evidence as to the negotiation history supports BAC. The drafts that were exchanged prior to the final version of the LTAA granted BAC broad rights to use the Hughes technology, limited only by the geographic location and nature of the customers, i.e. European governments or other European customers. The prior drafts, including one prepared by Hughes . . ., did not suggest that a satellite built for a European government or other European entity could not be launched in the United States or otherwise be restricted concerning United States patents. The language at issue appeared only in the very final version within a day or two of the end of the negotiations. Only BAC provided direct testimony as to the negotiations supporting its interpretation of that language. The testimony of the BAC witnesses was clear and unequivocal that this language was explained to them as being intended to prevent competition within the United States by BAC, in the nature of BAC manufacturing or selling satellites to potential Hughes customers.
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> In addition, the court believes that a reasonable observer in 1965, would have expected that the market for European satellites would not be restricted to satellites launched outside the United States. The United States launch vehicles were established and proven; the European heavy-launch vehicles remained undeveloped and somewhat conjectural. Therefore, it is only reasonable to think that

13 Cal. Civ. Code, §§ 1652, 1653 (West 1979).

14 Cal. Civ. Code, §§ 1641, 1650 (West 1979).

15 Heidlebaugh v. Miller, 271 P.2d 557, 559 (Cal. Dist. ct. App 1954).

> BAC and other European European companies would undertake bids on satellites that were hoped to be launched outside the United States but would probably be launched from U.S. launch sites. The court believes that this subject did not expressly come up during the negotiations, but that if it had, British Aerospace would have been unwilling to agree to limit its work to satellites that definitely had to be launched from outside the United States. This conclusion is reinforced by the fact that neither [of the U.S. patents at issue] were in existence at the time of the LTAA. Therefore neither party could know at what time and to what extent Hughes' application claims might be allowed. As a practical matter then BAC could not hope to undertake work on a U.S.-launched satellite that might possibly infringe on a subsequently issued patent. While it is not impossible that BAC would have been so willing, it seems to involve a strained reading of the realities of 1965. It is far more probable that the parties contemplated bidding on every European satellite, including those that were to be launched from the United States.[16]

In essence, the court found the LTAA reasonably susceptible to the interpretation of BAe, and held that an implied right existed for BAe and its customers to launch in the United States. Furthermore, the court found that rules of contract construction favored BAe. Hughes has filed a Notice of Appeal.

Innovative Space Technology and an Innovative Insurance Contract

There is no shortage of projects involving innovative technology currently being planned for space. Three examples are Spacehab, Worldspace DBS Radio and Iridium.

Spacehab is a company involved in a venture to design, manufacture and market modules which will fit into the payload bay of the Space Shuttle Orbiters which will quadruple space for man tended experiments by offering lockers for experimenters who might otherwise find it diffcult, if not impossible, to have access to the weightless environment of space.

DBS radio on a wide scale basis will likely become a reality thanks to the efforts of companies like Worldspace in ventures to manufacture, launch and offer direct broadcast radio service over wide areas using light and medium weight satellites.

Iridium is a Motorola project for a moving in-orbit cellular worldwide communications system using 77 low earth orbit satellites.

An innovative type of insurance contract designed to deal with risks involved in securing or maintaining government regulatory approval

16 British Aerospace v. Hughes, No. C 682 831, slip. op. at 18=19 (Cal. Super, Ct. Oct. 5, 1990).

of essential aspects of ventures, like the ones obove, has recently arrived on the scene to address contingency risks. The factors underlying some of the risks are often so complex, that insurers often retain third parties to perform risk assessments, to make sure that they are well informed on all those factors, so as to ultimately help insure the intents of the insurers and insureds are in accord.

Contingency risk insurance contracts do not cover physical property or person. Rather, they cover the possibility of losses arising out of fortuitous events of the future. The insureds purchasing this type of coverage in the past have been promoters of special events, such as Olympics, insuring against the risks associated with the cancellation of those events.

Spacehab has actually purchased a contingency risk insurance contract to protect against risks associated with the Space Shuttle program. If the Space Shuttle program were to be somehow discontinued or severely delayed, Spacehab would have no way to protect its investments, repay its bank loans and launch its specially tailored modules into space. Spacehab therefore sought and obtained, at the urging of its bankers, cover for its financial obligations (with certain timing related to deductibles) should Shuttle flights be discontinued, should NASA fail to honor commitments to furnish launch and associated services, should flight reservations scheduled for their modules be canceled or postponed by the government, or should modules not be delivered by the manufacturers (for reasons wholly beyond the control of the assured). According to press reports, some 150 insurers participate in the Spacehab coverage, with 80% written by Lloyd's syndicates and London insurers and the remainder spread throughout the United States, Japan and Europe.

Recommendations for Minimizing the Likelihood of Protracted Space Related Contract Disputes

Experience shows that three ways to minimize the chance of protracted space-related contract disputes are:

1. Risk assessments performed by knowledgable third parties before contracts are entered followed by candid discussions between contracting parties concerning anticipated difficulties.
2. Careful attention to the legal effect of the contract language, especially applicable law clauses, before contracts are entered.
3. For disputes that do arise, consideration of alternative resolution methods, especially non-binding mediation. Non-binding mediation is often effective in neutralizing hostility and causes parties to be more realistic about the strengths and weaknesses of their cases, after hearing the views of an impartial mediator. The mediator also serves as a communications bridge by meeting privately with the parties after presentations made when all were present.

Conclusion

Disputes over the intentions of the parties seem to underlie conflicts that develop involving space-related contracts. To minimize the likelihood of disputes, it is all important for parties to fully understand the subject matter of their contracts and the consequences of the contract language before contracts are entered. If disputes do arise, parties should seriously consider using alternative dispute resolution methods, especially nonbinding mediation, before leaving matters to the courts.

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Alpha Lyracom Space Communications, Inc., v. Communications Satellite Corporation

Congress enacted the Communications Satellite Act of 1962 ("CSA") to implement the national policy of establishing "in conjunction and in cooperation with other countries, as expeditiously as practicable a commercial communications satellite system."[1] Rather than relying solely on governmental efforts, Congress sought to provide for the widest possible particiation by private enterprise by creating Communications Satellite Corporation ("COMSAT"), a publicly held private corporation, to act subject to appropriate governmental regulation as the United States participant in the global system.[2] Under the CSA, COMSAT assumed responsibility for leasing space satellite telecommunciations channels to communications common carriers.[3] Section 701 (c) of the CSA declares the general intent of Congress to foster competition in the operation of, and provision of equipment, services, and access to, the satellite network and concludes with the so-called "antitrust consistency clause," which provides that "the activities of the corporation created under this chapter and of the persons and companies participating in the ownership of the corporation shall be consistent with the Federal antitrust laws."

A recent court of appeals case addressed the issue of whether COMSAT is immune from antitrust liability for activity in its role as the United States representative to the International Telecommunications Satellite Organization ("INTELSAT").[4] Alpha Lyracrom Space Communications, Inc. and Reynold V. Anselms, doing business as Pan American Satellite (collectively "PanAmSat"), owner and operator of the first international commercial communications satellite outside of INTELSAT, brought suit alleging that COMSAT violated the antitrust laws

1 47 U.S.C. sec. 701(a) (1988).

2 47 U.S.C. sec. 701(c) (1988).

3 47 U.S.C. sec. 735(a) (2) 1988.

4 946 F.2d 168 (2nd Cir. 1991).

and tortiously interfered with their relations with prospective customers.[5] Specifically, PanAmSat alleged that COMSAT, through INTELSAT and in conjunction with other signatories, engaged in a variety of anticompetitive practices in the market for international commercial satellite telecommunications services.

The district court dismissed the complaint on the grounds of COMSAT's statutory immunity from antitrust liability. The court of appeals concluded that dismissal on the grounds of immunity was proper, but held that remand was necessary to afford PanAmSat the opportunity to amend their complaint to replead allegations that might not encounter an immunity defense.[6]

In 1964 the United States and ten other nations entered into an interim executive agreement that created INTELSAT. The member nations later executed two additional executive agreements formalizing the ground rules for INTELSAT's control and management of the international satellite network and related support facilities. These agreements are known as "the Definitive Agreement"[7] and "the Operating Agreement."[8] The Definitive Agreement established a three-trier organizational structure for INTELSAT, comprising the Assembly of Parties, the Meeting of Signatories, and the Board of Governors. Each membernation of "Party" has a seat on the Assembly of Parties, and each member's designated "Signatory" to the Operating Agreement is represented in the Meeting of Signatories and the Board of Governors. The United States designated COMSAT as its signatory and representative to the Meeting of Signatories.

Together, the Definitive and Operating Agreements give the Assembly of Parties, the Meeting of Signatories, and the Board of Governors virtually plenary authority to set rates for the use of INTELSAT satellite capacity, to approve INTELSAT's purchases of goods and services, and to approve proposals to establish international and domestic telecommunications satellite systems separate from INTELSAT.[9] Article XV(c) of the Definitive Agreement requires each party to grant the appropriate privileges, exemptions and immunities to INTELSAT and the Signatories and representatives of Signatories.

The court found that paragraph 16 of the Headquarters Agreement, an agreement the United States entered into with INTELSAT in 1976, confers immunity from suit and legal process upon "the officers and employees of INTELSAT, the representatives of the Parties and of the

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5 *Id.* at 169.

6 *Id.*

7 Officially, *Agreement Relating to the International Telecommunications Satellite Organization.* For text, see UNITED STATES SPACE LAW - NATIONAL AND INTERNATIONAL REGULATIONS, at Sec. II.A.9 (Gorove ed. 1991).

8 Officially, *Operating Agreement Relating to the International Telecommunication Satellite Organization.* For text, see *id.* at Sec. II.A.10.

9 *Alpha Lyacrom Space Communications, Inc. v. Communication Satellite Corporation.*, 946 F. 2d at 170.

Signatories and persons participating in arbitration proceedings pursuant to the INTELSAT Agreement."[10] Members of the class enjoy immunity from suit "relating to acts performed by them in their official capacity and falling within their functions. . . ."[11] The court interpreted the phrase "representatives of the parties" to include signatories and noted that the United States designated COMSAT as its signatory and representative to the Meeting of Signatories.[12]

The central though behind the court's decision was the fact that COMSAT, as United States signatory to INTELSAT, must participate in the consulations that determine to what extent competing satellite systems will be permitted and that Congress, having created COMSAT to yield monopoly power along with other participants in a global satellite system, did not expect that corporation to face antitrust liability in deciding as a member of INTELSAT, whether and to what extent to permit competition.[13]

The court agreed with the district court that the "antitrust consistency clause" applies only to COMSAT's role (and that of its owners) as common carriers and not to its role as United States representative to INTELSAT.[14] The court found no authority for the proposition that COMSAT's role as participant in INTELSAT must conform to antitrust limitations. The case was remanded however because the court felt that the district court's dismissal was based upon the premise that PanAmSat's complaint alleged only activities by COMSAT in its capacity as United States representative to INTELSAT, as distinct from its capacity as a common carrier. The court agreed that the complaint was directed primarily at actions taken by COMSAT in its role as signatory to INTELSAT, but noted that the complaint did contain allegations of anti-competitive conduct by COMSAT in its role "as the sole provider of access to the global satellite system to United States communications carriers.[15] The court held that PanAmSat must be afforded an opportunity to amend their complaint to show which of the allegations arguably concern COMSAT's role as common carrier, but warned against any effort to "dress up 'Signatory' allegations in the language of 'common carrier' allegations."[16] The court was explicit in stating that, in order to survive dismissal on remand, it would not be sufficient for the amended complaint to allege unilateral rather than concerted conduct, but rather it must allege action taken as a common carrier rather than action taken as a signatory

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10 *Id.* at 171.

11 *Id.*

12 *Id.* at 174.

13 *Id.*

14 *Id.*

15 *Id.* at 175.

16 *Id.*

since even COMSAT's unilateral action might have been undretaken in its role as signatory to INTELSAT.[17]

Finally, the court did not find it necessary to consider the district court's alternative ground for dismissal of the antitrust claims - failure to join indispensable parties under antitrust claims - failure to join indispensable parties under Fed.R.Civ.P. 19 - since any allegations in the amended complaint challenging COMSAT's conduct in its role as common carrier are unlikely to encounter the indispensable party concerns with respect to "signatory" allegations. The adequacy of the state law claims for tortious interference with business opportunities was not assessed since all of the allegations concern COMSAT's consultative activity within INTELSAT, activities which are plainly "signatory."[18] PanAmSat may replead state law claims confined to COMSAT's common carrier role.

Short Accounts

NASA STI Database, Aerospace Database and ARIN Coverage of "Space Law"

Introduction

The NASA Scientific and Technical Information (STI) Database consists of almost thirty related files of literature of aerospace interest. The Aerospace Database consists of two groupings of four of these files containing all of the records found in the "Scientific and Technical Aerospace Reports" (STAR) and the "International Aerospace Abstracts" (IAA). IAA is produced for NASA by the American Institute of Aeronautics and Astronautics (AIAA). AIAA makes the Aerospace Database available on Dialog and on CD-ROM. The Aerospace Research Information Network (ARIN) is NASA's internal book file for the libraries that serve the various NASA Centers.

'Space Law' Content

The JOURNAL OF SPACE LAW is a prominent contributor to the body of 'space law' literature indexed in the NASA STI Database maintained at the NASA Center for AeroSpace Information in Linthicum Heights, Maryland. Currently there are 132 abstracted entries for the JOURNAL OF SPACE LAW for 1968-1991 averaging ten "NASA Thesaurus" terms per record. There are 1555 entries under 'Space Law' on the NASA STI Database for the same period. There are also earlier records without abstracts in the database (1962 to 1967) that amount to 322 records. ARIN lists 798 book records at various NASA Centers. Together the NASA STI Database and ARIN contain 2,685 records indexed to 'Space Law'

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17 *Id.*

18 *Id.*

NASA Thesaurus 'Space Law' Terminology

There are many more records of 'Space Law' interest included in the NASA STI Database that are not indexed to 'Space Law.' The "NASA Thesaurus" leads to several related terms such as 'Air Law,' 'Direct Broadcast Satellites,' 'Outer Space Treaty,' and 'Sabatoge.' These related terms just scratch the surface of terms that might show a connection. Looking at the last five years 434 'Space Law' postings by frequency of occurence of terms reveals 292 terms that occur twice or more and are also indexed to 'Space Law.' These terms show the diversity of terms that relate to 'Space Law.' Some of the most frequent terms not already mentioned are 'Space Commercialization,' 'International Cooperation,' 'Space Stations,' 'International Law,' 'Legal Liability,' 'International Relations,' and 'United Nations.' These terms are all posted to records along with 'Space Law' and occur sixty times or more.

'Space Law' Publications Form

Although the strength of NASA/RECON's coverage of 'Space Law' topics lies in its subject access to both controlled vocabulary and text searchable words and phrases, the wide coverage of varieties and forms of 'Space Law' literature is important. The bulk (1235 items) of 'Space Law' coverage since 1968 is in periodical literature both domestic and foreign. In the last 5 years nearly 10 percent of the articles were in German, Polish, Russian, or Spanish. In addition countless items were translated from their original language into English. Remarkably, there are nearly 900 'Space Law' books. Although actual entries for laws are rare, there are 529 references to the 'Outer Space Treaty.' NASA is indeed a rich source for 'Space Law' material.

Availability

The computerized access to most items through the European Space Agency is well known in Europe. Availability of most 'Space Law' report literature found in STAR is through the National Technical Information Service (NTIS). Most journals and books are open literature and available through the American Institute of Aeronautics and Astronautics (AIAA) or from your local library.

Ronald L. Buchan
Lexicographer
NASA Scientific and Technical Information Program

ECSL Activities in the Area of Protection of Satellite Produced Remote Sensing Data

The European Centre For Space Law (ECSL)[1] has since its conception in 1989 been active in researching the legal aspects of remote sensing in Europe. Later research focused on the issue of the legal protection of satellite remote sensing data in Europe.

First, a study was carried out by a consultant in order to identify the legal issues at stake and to find out whether there was an interest outside ESA/ECSL in taking initiatives to clarify the legal status of their data. The results of the study were presented at a workshop in Frascati, Italy, in May 1991. This was a very successful event; not only almost all sectors of the European remote sensing "industry" were represented at the workshop but also an interest was expressed on the part of the European Commission to proceed with a further study and research of this issue which could then be the starting point of a new regulation (or other measures) to protect this kind of data in such a way that both suppliers and consumers could make an optimal benefit from the remote sensing activities. Which are the questions at stake and why there is a need for action in this area in Europe and outside Europe to come to a harmonized regulation for satellite remote sensing?

Without going into detail, the basic question at stake is the legal character of the data produced by remote sensing satellites. In actual practice, there appears to be confusion under which type of law the data and thus the contracts for reception and distribution of the data should fall. Conflicting schemes for protection are applied as copyright laws, trade secret laws, or just ownership rights which all lead to different rights and obligations for the suppliers and distributors of these data. It is clear that from a commercial point of view this situation can hardly be considered as being positive for the further development of this market.

Even more complicating is the political dimension of remote sensing because of its importance for studying global climate change of the Earth environment and the question of access to the data by the sensed state.

These questions and many others will be addressed in the study issued by the European Commission and will also be the points of discussion at the joint ECSL/IISL Session on the legal protection of satellite remote sensing data at the European International Space Year's Conference in Munich on the 31st of March. Speakers at the Session will be *Dr. Gibson* (former ESA Director General), *Dr. Brachet* (Director General, SPOT IMAGE), *Dr. Dreier* (expert of the Munich Max Planck Institute), *Dr. Thiem* (Head of administration of EUMETSAT), *Dr. Tokumaro* (expert of UNESCO),

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1 For information on ECSL, see: M. Bourély, *Une initiative de l'Agence Spatiale Européennne: la création du Centre Européen de Recherche en Droit de l'Espace*, 17 ANNALS AIR & SPACE L. 170*ff.* and G. Lafferranderie, *Launch of the European Centre for Space Law*, 17 J. SPACE L 170 (1989).

Dr. Shaffer (expert of NASA) and *Dr. Ferrazzani* (Office of Legal Affairs, ESA). At the end of this year the study of the European Commission will be finished and the results will be discussed at a workshop in Brussels. In conclusion, it must observed that this initiative of ECSL (its first own study!) was a very successful one and we hope that we can continue this line with the second study we are currently carrying out concerning intellectual property rights in outer space.

G. Lafferranderie
General Counsel, European Space Agency
Chairman, ECSL

First Italian Conference on "Recent Developments and Prospects in Outer Space Law"

1992 being the International Year of Outer Space, the Institute of International Law of the Faculty of Economics of Rome University "La Sapienza" organized the first Italian Conference on "Recent Developments and Prospects in Outer Space Law" on the 13th and 14th of March 1992. The meeting was in memory of *Prof. Luigi Napolitanco* renowned scholar, known in all the scientific world, formerly professor of Aerodynamic Engineering at the "Nobile" Institute of Naples University.

Prof. E. Chiacchierini, dean of the faculty, opened the meeting on behalf of the Institute, addressed the audience explaining that the converging interests on the specific subject originate an active exchange of information among the scientific and cultural world, the technological and commercial one, and the legal world. *Prof. Beghé* also underlined the relevant role of *Dr. G. Catalano Sgrosso* as organizer of the meeting. The speeches given by *L. Saporito*, under-secretary of the Italian Ministry for University and Scientific Research, by *Prof. L. Guerriero*, president of the Italian Space Agency, by *Dr. R. Minicucci*, managing director of Telespazio and by *Gen. S. Nardini*, Chief of Staff of the Italian Airforce, introduced the subject of space law.

The legal meeting was begun and brilliantly ended by *Prof. E. Pocar*, professor of International Law and Province-Chancellor of Milan University,and also the Italian delegate to UNCOPUOS.

Important organizations for research on space law were represented by French, Dutch, German, Swedish and Russian participants, who honored the meeting with their presence and their scientific contributions: Dutch *Prof. Diederiks Verschoor*, from the Institute of Aerospace Law of Leiden University, presided over the third session and presented a speech on the responsibility of States; Russian *Prof. Vereshchetin*, from the Academy of the Sciences in Moscow, illustrated the problems of pollution of the space environment; *Prof. Bourély*, President of the French Society for Aerospace Law compared the outlines of air law and space law; *Dr. Courteix*, Director of Research at the CNES in Paris, spoke about law facing technological changes of direct broadcast satellites; *Dr. Lafferanderie*, illustrated the legal outlines of the European Space Agency of which he is legal counsellor;

Prof. Doimi De Lupis of Frankopan, from Stockholm University, talked about the jurisdiction and control of space objects and finally, representing the Centre for Research on Space Law of Cologne, directed by *Prof. Böckstiegel* - who was absent because of former engagements in the United States - *Dr. Kramer* addressed the registration of space objects.

Reports were also given by Italian professors competent in the field of space law. The general principles of space law were outlined by *Prof. Durante* of Rome Univerity "La Sapienza;" the new aspect of demilitarization of outer space was approached by *Prof. Ballarino* of Padova University; under the chairmanship of *Prof. Capotorti* of Rome University "La Sapienza," *Prof. Zanghi*, from Messina University, underlined the contrasts between European cooperation and Community regulations and *Dr. Catalano Sgrosso* illustrated the legal aspects of remote sensing. On Saturday morning *Prof. Back Impellomeni*, from Padova University, talked about the exploitation of resources on the Moon and the concept of a commmon heritage of mankind, and *Prof. Lanza*, from Rome University "Tor Vergata" spoke about the legal regime of the geostationary orbit.

The objectives that this interdisciplinary meeting wanted to achieve were research, as the main expression of culture, industrial interest, as the qualifying aspect of proper development, and recognition of the necessity of controlling the different activities through regulations agreed upon at an international level.

*Dr. Gabriella Catalano Sgrosso**

Report on the Activities of the American Institute of Aeronautics and Astronautics

Several noteworthy developments have occurred since this Journal published its last report on the activities of the Legal Aspects Committee (Committee) of the American Institute of Aeronautics and Astronautics (AIAA).[1] One of the Committee's subcommittees completed the first phase of its work. Also, a new subcommittee was created. Moreover, this year's Annual Meeting proved to be a great success, featuring speakers on a variety of space law topics, and attracting substantial participation among Committee members.

In April 1992, the AIAA published a report entitled "Orbital Debris Mitigation Techniques: Technical, Legal, and Economic Aspects" prepared by its Orbital Debris Study Group. The Committee participated in this multidisciplinary AIAA Study Group through its Legal Subcommittee on Orbital Debris, and provided significant input to the report, which recommended, *inter alia*, that the National Space Council assume a leadership role in certain debris-related policy matters; that

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1 *See* 19 J. SPACE L. 81 (1991).

Federal agencies regulating private space activities issue notices of inquiry with regard to existing debris mitigation practices and possible future standards; and that the U.S. convene a conference of spacefaring nations to discuss international debris mitigation requirements. The Study Group was chaired by *Paul Uhlir*, Assistant Executive Director, National Academy of Sciences, who is a member of the Committee.

Another legal subcommittee, focusing on physical coordination of commercial low-Earth orbit satellite systems has had an active agenda since its formation in November 1991. Entitled "Legal Subcommittee on Low-Earth Orbit Commercial Satellite Systems," this subcommittee is concerned with the legal regime for an emerging commercial low-Earth orbit satellite industry, including jurisdictional and liability issues relating to physical interference. The subcommittee's formation was prompted by the many applications pending before the Federal Communications Commission for authorizations to construct, launch, and operate satellite constellations, with anywhere from two to 77 satellites, at orbital altitudes ranging from about 760 km to 10,360 km. The satellites are intended for mobile communication and radiodetermination applications.

The Committee held its Annual Meeting on April 28, 1992, in conjunction with the AIAA Annual Meeting. Committee members and guest speakers covered a variety of space law topics. *Gerald Musarra*, Director of Space Industry Trade Policy, U. S. Trade Representative (USTR), provided interesting insights into ongoing trade negotiations between the USTR and the European Space Agency. He also touched upon U.S. space trade policy *vis a vis* the Soviet Union and the People's Republic of China, and noted that prohibitions persist with respect to export of U.S.-made satellites for launches on launch vehicles offered by both of these countries.

Elaine David, Counsel to the Department of Transportation's Office of Commercial Space Transportation (OCST), enlightened the Committee on developments in launch licensing policies. She talked about OCST's experience with "program" licensing, a practice instituted last year. A program license allows a launch operator to perform any number of launches within a specified time period (*e.g.*, two years). Traditionally, a separate license had to be obtained for each individual launch. *Ms. David* also mentioned that since September 18, 1991, application processing fees have been levied upon launch license applicants, and that OCST in March 1992 adopted safety evaluation criteria for reentry vehicles.[2] *Franceska Schroeder* of Haight, Gardner, Poor & Havens spoke enthusiastically about proposed amendments to the International Traffic in Arms Regulations that would make it easier to obtain export licenses for certain kinds of commercial satellites. She explained that, if the amendments are adopted, commercial communications satellites that are not "military" in nature will be removed from the Munitions List, which is administered by the Department of State, and placed within the jurisdiction of the Department

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2 *See* 56 Fed. Reg. 41062 (1991) and 57 Fed. Reg. 10213 (1992), respectively.

of Commerce, which has a more relaxed licensing regime.[3] *Scott Pace*, Deputy Director of the Department of Commerce's Office of Space Commerce, reported on pending legislation amending the Land Remote Sensing Commercialization Act of 1984. The legislation seeks to transfer management responsibility for LANDSAT to the National Aeronautics and Space Administration and the Department of Defense, as well as to ease the regulatory burdens imposed on private remote-sensing satellite operators in order to stimulate more private sector activity in this area. *Mr. Pace* predicted that H.R. 3614, entitled the "National Landsat Policy Act of 1992," would pass the House in the near future. (It did on June 9, 1992). A Senate companion bill, entitled the "Land Remote Sensing Policy Act of 1992, was introduced on February 27, 1992 (S. 2297).

Barry Beringer, Republican General Counsel to the House Committee on Science, Space, and Transportation, discussed legislative initiatives aimed at providing various incentives to private enterprise in space. Bills to this effect have been introduced by Congressmen *R.S. Walker* (H.R. 3153) and *R.M. Hall* (H.R. 3848), respectively. The *Walker* bill entitled "Omnibus Space Commercialization Act of 1991" seeks to provide a more conducive climate for private commercial space activities, primarily through tax incentives. The *Hall* bill, entitled "Commercial Space Competitiveness Act of 1991," provides for matching grants for space transportation infrastructure projects, commercial use of missile assets, as well as for the extension of the currently provided government indemnification of private launch companies for third party liability exceeding the amount of insurance they have obtained.[4] A Senate companion bill has been introduced (S. 2789). Moreover, the NASA authorization bill for F.Y. 1993, which passed the Senate Committee on Commerce, Science, and Transportation, incorporates language which, if enacted, would extend the government indemnification of private launch companies, as called for in the Hall bill, to January 1, 2000.[5] Finally, *Bruce Rashkow*, Assistant Legal Adviser for United Nations Legal Affairs, Office of the Legal Adviser, Department of State, reviewed recent activities in the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). He said the COPUOS Legal Subcommittee is near consensus on "Principles Relevant to the Use of Nuclear Power Sources in Outer Space," and that final agreement may be reached this summer or fall. Criteria for safe use of nuclear power sources and, especially radiation dose limitations, are particularly controversial. *Mr. Rashkow* also noted that the U.S. is troubled by the interpretation by some countries of the COPUOS Legal Subcommittee agenda item concerning the conduct of space activities for the "benefit and in the interests of all States." On the positive side, *Mr. Rashkow* said a recently submitted "non-paper" by the Russian Federation to consider "aerospace

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3 *See* 57 Fed. Reg. 14671 (1992).

4 *See* 49 U.S.C. sec. 2615(b) (1988).

5 *See* H.R. 4364.

objects" may provide some impetus to the long-deadlocked debate on the delimitation of space.

William D. English[*] and
Pamela L. Meredith[**]

Other Events

The Sixth International Conference on "Commercial and Industrial Activities in Space in the 1990s: Insurance Implications" was held in Rome on September 16-17, 1991. The discussions addressed concerns about high premium levels and issues pertaining to hardware manufacturer's exemptions from liability.

There was a workshop cosponsored by the European Centre for Space Law and the Dutch NPOC on the European Community Commission's Greenpaper on satellite telecommunications held Sept. 27, 1991 in Aztec.

The Fifth National Space Symposium of the United States Space Foundation was held March 31-April 3, 1992 in Colorado Springs and featured a number of astronauts.

Space Commerce 92 held March 23-26, 1992 in Montreux, Switzerland had on its agenda discussions on international outer space laws and commercial space as well as current policy and legal issues.

The International Space Law Interest Group of the American Society of International Law held an Open Forum discussion on "Basic Terms in International Space Law: Is there a Need for Clarification and, if so, What?" during the Society's annual meeting on April 2, 1992 in Washington, D.C.

The Space Law Committee of the International Law Association met in Cairo, Egypt, on April 21, 1992 and continued discussion of its work on the drafting of an internatxional instrument concerning the protection of the environment from damage (harm) caused by space activities.

An International Colloquium on "Manned Space Flight - Legal Aspects in the Light of Scientific and Technical Development" was held in Cologne, Germany, on May 19-22, 1992. Its discussion focused on a Draft for a Convention on Manned Space Flight prepared under auspices of three leading institutions and directed by their representatives in Germany, the United States and the former U.S.S.R.

On June 24-26, 1992, there was a major symposium with international participation at the University of Chicago on the occasion of the latter's Centennial and the International Space Year. It dealt with the Preservation of Near-Earth Space For Future Generations.

Brief News

International Space Year, with the primary theme "Mission to Planet Earth," and an emphasis on global cooperation, is being held

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[*] Chairman, AIAA Legal Aspects Committee.

[**] Member, AIAA Legal Aspects Committee.

throughout 1992 in conjunction with the celebration of the 500th anniversary of Columbus's voyage.

NASA is ready to spend $100 million on extensive alien search to begin on October 12, 1992, Columbus Day . . . On its way to study the sun's poles, the Ulysses spacecraft passed through Jupiter's radiation belts, the strongest such belts in our solar system . . . The Space Station Freedom may require seven shuttle missions and may not be permanently staffed until the year 2000.. .The first husband and wife team is scheduled to fly aboard the shuttle in September 1992.

The **Strategic Defense Initiative** reportedly is interested in purchasing from the former **Soviet Union**, a prototype of a nuclear power source (called Topaz 2) that would orbit the earth and electric propulsion units (known as Hall thrusters) for rockets that would be capable of lower-cost space flights than currently used chemical rockets. . . . Likely areas of U.S.-Russian cooperation in Star Wars technology might be space sensors and other early warning systems which could also help track missiles from Third World countries. . . Nine republics, not including Ukraine and Moldova, in the new **Commonwealth of Independent States** signed a 12-article agreement on December 30, 1991 providing for the establishment of an interstate space council to oversee the Commonwealth's space programs which is to be funded by proportionate contributions. The republics may have their own programs independent of the Commonwealth and not participating republics may join later. . . President Yeltsin established a Russian Space Agency. . . The decrease in Soviet space launches in 1991 is believed to be attributable not to the political turmoil but to improvements in the longevity of Soviet spacecraft.

INTELSAT's budget remained $140 million for 1992 as it was for 1991. . . **INMARSAT** expects to provide a world-wide, pocket-sized satellite phone service by the end of the decade. . . . **Italspazio** of Rome designed two small communications satellites Ministar for TV broadcasting from geostationary orbit and Leostar for communication and remote sensing from low earth orbit.

B. FORTHCOMING EVENTS

As reported previously, the **1992 Colloquium on the Law of Outer Space** will be held **August 28-Sept.5** in Washington, D.C. Topics to be discussed are: (1) Emerging and future supplements to space law, specifically in the context of the International Space Year; (2) Legal regulation of economic uses of outer space; (3) Managing environmental issues, including space debris, and (4) Other legal subjects. The Scientific/Legal roundtable is scheduled for the afternoon of September 3.

The **1993 Colloquium** will be held in Graz, Austria, **October 16-22, 1993.** The following topics will be discussed: (1) Adjudication and arbitration of disputes regarding space activities; (2) Legal aspects of space insurance; (3) Legal Aspects of space activities of organizations of the U.N. System and other international organizations (e.g. ICAO, WMO, WHO, FAO, IAEA, ITU, etc.)

Book Reviews

La responsabilitá degli Stati per le attivitá svolte nollo spazio extra-atmosferico by Gabriella Catalano Sgrosso, Cedam, Padova, 1990, pp. XXVIII, 103.

The subject of this book is at the same time a classical and a new one. Since the adoption of the Convention on International Liability for Damage Caused by Space Objects on 29 March 1972, it has been dealt with and revisited by several scholars who have greatly contributed to the clarification of the notion of absolute liability contained therein. However, recent developments in space activities have also shown the need for an improvement of international legislation, with a view to meeting the new aspects of such activities. In this context, the 1972 Convention can only be regarded as one, although the most important, element to be taken into account in order to deal with the subject in current international law. An important role has also to be assigned to other international agreements, as well as to legislation related to their implementation, in particular within international organizations.

The author's approach to this multifaceted legislation is comprehensive. Out of the four chapters of her book, only the first one contains an analysis of the Convention and its main features, stressing its innovating role in giving detailed consideration to the principle of international liability for damage, set forth in article VII of the 1967 Space Treaty, as distinct from international responsibility for national activities in outer space. The second chapter is devoted to a succinct description of the problems related to the protection of the earth and space environment and to the adoption of a satisfactory legislation thereon.

The following sections of the book are more focused on the implementation of general principles and deal with two special topics of great interest, *i.e.*, the international liability of the European Space Agency (ESA) and the liability issues in the framework of the ESA participation in the creation of an international space station. On the one hand, the author considers the practice of ESA, its resolutions and its agreements with Member States, as well as the cooperation between ESA and NASA especially in the commercial field; on the other hand, she focuses on the legal regime of the space station, on the regulations as to inventions made in outer space and on the relevant provisions of the agreement signed in 1988 on cooperation in the detailed design, development, operation and utilization of the permanently manned civil space station.

Within the foregoing outline, the subject of international liability for damage caused by space activities is considered and analyzed to a large extent in the light of the European (and Italian) cooperation in space programmes. Thus, especially the sections describing the role and the

practice of ESA contribute significantly to the clarification of some relevant areas of space law.

*Fausto Pocar**

Principles of Outer Space Law in Hindsight by Henri A. Wassenbergh, Nyhoff, 1991, pp. 172.

The author, a well-known expert in air and space law, is Professor at Leyden University on these disciplines and Chairman of the Institute of Air and Space Law. His book contains a Foreword and an introduction to the subject of space law in eleven parts on selected topics with original thoughts and basic ideas, leaving further elaborations on them to others.

Already the Foreword is a very worthwhile reading assignment in as much as it provides a realistic and practical view of such concepts as "equal rights," "sovereignty," etc. Also interesting is the author's conclusion in Part I that adoption of a functional approach to space law would mean, for instance, that there would be a "right of innocent passage" of space objects through foreign air space when it has been established that such space objects are engaged in a space activity which is considered lawful, and its "innocence has been established." It is quite appropriate that the author stresses this point (p. 18). He discerns law governing earth-related space activities, law governing state activities in outer space and the law of mankind that would aim at providing equitable shares of benefits for all peoples (p. 20).

Especially valuable is Part II, dealing with States and Private Enterprise because this is a part of space law which is in full development. The problems are treated in a clear manner with good suggestions for the future (p. 30). In view of the scope of these observations, it is not possible to go deeper into this. Part III is a plea to consider space as qualifying for a regime *sui generis*. Part IV deals with the Moon Agreement, whereas Part V gives interesting observations on space transportation systems, mentioning, for instance, that the NASAct makes a distinction between aeronautical and space vehicles and that NASA's Shuttle is not considered a "common carrier."

One may wonder why Part VI "The Moon Agreement in Prospect" has not been placed after Part IV "The Moon Agreement in Retrospect" and Part VIII about the "Common Heritage of Mankind" after Part VI. In my opinion, this would have formed a logical triolet.

Environmental problems in space are treated in Part VII, while principles of direct broadcasting by satellite and remote sensing, and the relevant U.N. resolutions are discussed in Part IX. Part X stresses the importance of having a standard domestic space legislation for national space activities and gives a draft specimen of an Outer Space Act for the Netherlands which would be of useful guidance. Finally, the last part of the book gives a survey of *leges speciales* and the demilitarization of outer

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space. In an Afterword the thoughts of the Foreword are stressed one more time. Useful Annexes to this book include the texts of the five space treaties, the two UN resolutions as well as the draft principles relevant to the use of nuclear powered spacecraft in outer space.

As can be expected of the author, the book gives brilliant suggestions and ideas which can contribute to the development of future legislation in space. What is lacking in this valuable book, however, is a thorough documentation. Notes are rare and, in general, the reader who would like to know more about certain facts or theories finds himself deserted. All in all, the book should be of interest to those persons who already have a knowledge about space law and certainly to those who are involved in future developments.

*Prof. Dr. I.H.Ph. Diederiks-Verschoor**

Space Weapons and the Strategic Defense Initiative, by Crockett L. Grabbe, Iowa State University Press/Ames, 1991, pp. 252.

This excellent volume provides a comprehensive discussion of space weaponry from a political and scientific perspective, and was written by a plasma physicist at the University of Iowa, Iowa City, whose research work includes wave propagation and instabilities in space plasmas. The book is divided into three general parts which deal with the military uses of space, weapons systems and the political consequences of both.

The brief first part provides an overview of the military uses of space with emphasis on defensive measures. Upon this foundation the chapters of the second part provide a discussion of various systems of space defense, with particular weight allotted those associated with the Strategic Defense Initiative.

The book's third part supplies the bulk of the book and is of most interest to the space lawyer. There is a discussion of the utility of space defense systems and their political impact, both upon the participant nations and others. There is a chapter-length treatment of the impact of SDI upon various existing arms control treaties, and on the general recent trend toward easing East-West tensions. Another chapter focuses upon the potential consequences of space weapons, including the possibility of accidental war, the effects upon disarmament, as well as economic repercussions. An epilogue provides an update as to the very latest strategic defense technology, i.e., the brilliant pebble concept, evaluates SDI work already accomplished, and that planned for the near future.

Overall the book provides a handy reference work on the subjects discussed, whose value seems in no way lessened by recent events in the Soviet Union. The volume is profusely illustrated with drawings and charts, and contains 100 pages of appendices, notes, an index and glossary. Its usefulness to the space lawyer is enhanced by inclusion of the text of more than a half-dozen treaties. Additionally, appendices provide easily

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understandable explanations of pertinent scientific concepts prepared with the non-technical reader in mind.

International Regulation of Satellite Communication, by Milton L. Smith (Martinus Nijhoff/Dordrecht 1990), pp. 245.

Currently more than a hundred communications satellites are in geostationary orbit contributing to the progress of the global economy. A less obvious fact is that desirable orbits are a finite resource capable of monopolization by nations which pioneered development in the field. This book is about attempts to resolve the competing needs of developed and developing countries in regard to communication satellites. Central to the book's scope are the two sessions of the International Telecommunication Union's World Administrative Radio Conference (Space WARC) and the resultant regulatory schemes.

Four appendices contribute much to this little book's worth. Its author holds a doctorate in Space Law and serves as Chief of Air and Space Law for the U.S. Air Force Office of Juge Advocate General, and is an adjunct professor at George Washington University Law Center.

To See the World -- The Global Dimension in International Direct Television Broadcasting by Satellites by M Lesueur Stewart, Martinus Nijhoff, 1991, pp. 630.

In this comprehensive book *Dr. Stewart* provides a well documented analysis of the "Principles Governing the Use of Artificial Earth Satellites for International Direct Television Broadcasting" ("IDTBS Principles") adopted by the General Assembly of the United Nations in 1982.

The first part of the book describes the current status and the legal basis and objectives of the IDTBS Principles. Initially, the focus is upon the resolution of the issue of free flow of information versus national sovereignty, which was key to defining the types of programming acceptable for international broadcasting under the Principles. IDTBS purposes and objectives, especially the free dissemination and mutual exchange of information and knowledge geared toward aiding social, educational and economic development, but carried out in the spirit of non-intervention and cooperation between States, are examined from a legal standpoint with a view toward a truly global perspective. *Dr. Stewart* shares her vision of the global potential of advancing educational uses of international broadcasting based upon the concept of mankind's common heritage. In conclusion, the author makes recommendations for revision of the IDTBS Principles with emphasis upon seeking international consensus for the "Global Dimension."

The second part of the study consists of 400 pages of appendices and basic papers which document the textual materials making the book useful for students and practitioners of international broadcast law and those otherwise interested in general topics of space law.

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Other Legal Subjects

Addenda

CURRENT DOCUMENT

Statute of the Russian Space Agency of the Government of the Russian Federation*

1. The Russian Space Agency of the Government of the Russian Federation (RSA) is a State administrative body which formulates and implements State policy on the exploration and use of outer space.

2. The main tasks of RSA are:

To implement State policy on the exploration and use of outer space;

To formulate, in conjunction with the Russian Academy of Sciences, the Unified Armed Forces of the Commonwealth of Independent States, and the ministries, departments and organizations concerned, and to submit to the Government of the Russian Federation the draft State space programme of the Russian Federation, specifying the financial and other resources required, and also the dates for the completion of activities;

To carry out general procurement for the development of space systems, complexes and scientific and industrial facilities envisaged under the State space programme;

To participate in the development and use of dual-purpose (military and civilian) space systems, complexes and resources developed under defence contracts in accordance with the State space programme, and also in the preparation and launching of space complexes for scientific and national economic purposes;

To develop, in conjunction with industrial organizations and enterprises, a scientific research and testing base for space activities, and to establish scientific and technical stocks for the development of rocket and space technology;

To cooperate with the relevant bodies of member States of the Commonwealth of Independent States and of foreign countries in the exploration and use of outer space, and also in the use of ground-based space facilities, within the limits of its competence;

To coordinate work on commercial space projects and promote their implementation;

To coordinate work on the preparation and conduct of manned space flights and the protection of the safety of cosmonauts.

3. The Russian Space Agency shall, in accordance with the tasks entrusted to it:

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* Approved by decree of 9 April 1992 of the Government of the Russian Federation. Abbreviated version. Taken from U.N. Doc. A/AC.105/L.195 (18 June 1992).

Organize, in conjunction with the ministries, departments and organizations concerned, systems research to support the main areas of the development of space technology for scientific and industrial purposes and to determine the tactical and technical characteristics of space complexes;

Prepare on the basis of the State space programme and submit to the Government of the Russian Federation proposals on the Agency's budget for the following year;

Formulate in conjunction with the Russian Academy of Sciences and the ministries, departments and organizations concerned, on the basis of the State space programme and in accordance with its budget, and submit to the Government of the Russian Federation a draft programme of work in the Russian Federation for the following year;

Participate in the organization and conduct of scientific research, experimental and design and construction work on the development and use of dual-purpose space technology, and also of work to maintain and develop ground-based space facilities infrastructure;

Carry out scientific research, experimental and design and construction work on space technology for scientific and industrial purposes, procure supplies and organize the use of individual types of this technology in accordance with the Russian Federation's space technology work programme for the following year (space vehicles developed for the purposes of the Ministry of Communications of the Russian Federation and the Ministry of Ecology and Natural Resources of the Russian Federation shall, as a rule, be procured and operated by these ministries);

Ensure the continuing development of new technologies, materials and scientific and technical stocks in order to develop promising types of space technology;

Maintain and develop the experimental and testing base needed to develop space technology under ground conditions;

Carry out research, scientific and technical monitoring and organization of work on the use, as a means for launching various space devices, of strategic missile systems which are scheduled for reduction or elimination;

- Cooperate with the corresponding organs of the member States of the Commonwealth and the Unified Armed Forces of the Commonwealth of Independent States in aspects of the conduct of joint space activities, the use of ground-based space facilities and the implementation of the other provisions of the inter-State agreement on joint activities in the study and utilization of outer space;

- Ensure, in conjunction with the ministries and departments concerned, compliance with the international obligations of the Russian Federation in the field of space activities and the development of mutually

advantageous cooperation with government and commercial organizations of foreign countries;

- Conduct, in conjunction with the Ministry of Foreign Affairs of the Russian Federation and the other ministries and departments concerned, discussions on the conclusion of international agreements for the exploration and use of outer space;

- Conclude, within the limits of its competence, international agreements with the corresponding organizations of foreign States;

- Maintain a register of space objects of the Russian Federation and submit information to the United Nations on space objects launched by the Russian Federation;

- Conduct, in accordance with established procedures, the issue of licences for all types of activity in the exploration and use of outer space and the provision of space services in the Russian Federation, and keep a record of those licences;

- Participate in the preparation of standards relating to the manufacture and use of space technology;

- Participate in monitoring compliance with safety requirements, standards and regulatory documents in the manufacture, testing and use of civilian space technology;

- Organize information services for the public, and take part in exhibitions of rocket and space technology and in the preparation and publication of scientific and technical literature on space activities;

- Elaborate, in conjunction with the ministries and departments concerned, draft legislative and other regulatory acts governing activities in the exploration and use of outer space.

4. The Russian Space Agency shall have the right:

- To acquire, lease, install, reconstruct and operate space and other forms of technology (including space vehicles and carrier-rockets), buildings and installations and other property and to acquire patents, licences and know-how;

- To conclude, on the basis of the space technology programme of the Russian Federation for the given year and in accordance with the regime established by the legislation of the Russian Federation, contracts for the conduct of basic, experimental and design studies, scientific research and work on the application of technology with ministries, departments, organizations and enterprises operating in the territory of the Russian Federation and of other States and to use extrabudgetary resources for the financing of such studies;

- To be represented, in accordance with its competence, in international organizations active in the exploration and use of outer space;

- To engage the services of experts on a contractual basis for the purpose of consultations or the preparation and consideration of relevant issues, and to set up temporary task forces and working groups;

- To engage in foreign economic activity in accordance with the established legal procedures;

- To send, in accordance with established procedures, employees of the Agency on official visits to foreign countries and to receive foreign specialists at the Agency to deal with issues connected with the Agency's work;

- To arrange the admission of foreign specialists, to launching sites and other ground-based space facilities, by agreement with the Office of the Chief of Space Resources of the Unified Armed Forces of the Commonwealth of Independent States and the corresponding organs of the member States of the Commonwealth;

- To engage, in accordance with established procedures, in international telephone, telex and facsimile communications.

5. The Russian Space Agency shall be headed by a General Director, who shall be appointed and dismissed by the President of the Russian Federation.

6. The General Director of the Russian Space Agency shall have deputies, appointed on his recommendation by the Government of the Russian Federation.

7. The Russian Space Agency shall operate settlement, current and budget accounts in banks, including foreign currency accounts.

8. The Russian Space Agency shall be a juridical person and shall have a seal depicting the state emblem of the Russian Federation and its own name, as well as the emblem (logo) of the Agency.

Developments in Space Law

Issues and Policies

by **Stephen Gorove**

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Following an overview of United States domestic space laws, this book focuses on some of the crucial issues that space lawyers and policy makers had to face during the last two decades. Presented in thirty-three chapters, the materials highlight basic issues associated with the use of the geostationary orbit, international direct television broadcasting by satellite, solar powered satellites and the relevant concerns of developing nations. The book addresses policies regarding the protection of the space environment, deals with issues of space transportation systems, international space flight, liability for damage, arms control, remote sensing from space, and those associated with space stations. The study also projects expectations and presents a case study of issues that are likely to arise with the aerospace plane. Major international space instruments are reproduced in the Annex.

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