INTERNATIONAL LIABILITY FOR DAMAGE: PROPOSED SOLUTIONS FOR THE ERA OF COMMERCIAL SPACE ACTIVITY

BY

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It has been observed that "time will soon be ripe for the international law governing damage caused by space objects to reflect modern realities."[2] In fact the establishment of international laws and institutions for the determination of liability and the award of compensation for damage arising from space activities has become urgent. This urgency results from two inter-related factors. First, in many fields of space endeavour government and international organizations are becoming overtaken by private commercial entities. In satellite communications this has already occurred, where PanAmSat vies with Intelsat as the largest provider of satellite capacity for international traffic and new entrants such as Iridium, Globalstar, ICO and Teledesic[3] and their successors do or will operate hundreds of communication satellites. International organizations, with their special place in space law, are becoming privatized commercial corporations, without losing their international reach and power[4].

Second, many new areas of space activity are becoming commercially viable and attractive, presenting more extensive possibilities for damage from space activity. Notable among these are space transportation, geographic positioning and navigation systems.

It is not the intention here to add to the extensive ink already spilt in debating and examining the scope and meaning of the liability and responsibility provisions of the Liability Convention and of the Outer Space Treaty. The debate to date has been academically interesting and stimulating, but has brought us no nearer the level of clarity and certainty that is necessary for commercial activity to grow and thrive, whilst safeguarding the interests of those suffering damages. The focus and the intent here is to offer a starting point for an international liability regime in the context of modern commercial space activity.

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2 Maniatis, Dmitiri, *The Law Governing Liability for Damage Caused by Space Objects*, Annals of Air and Space Law, (1997), Vol XXII, 369 at 401.

3 Iridium has a 66 satellite constellation in orbit; Teledesic plans a constellation of 280 satellites.

4 Inmarsat has already formed itself into a private company under English law and Intelsat and Eutelsat both plan to become private companies. Intelsat has already transferred some of its assets to a private entity, New Skies, based in the Netherlands.

STRUCTURE OF THE INTERNATIONAL REGIME

In any attempt to create an international regime a choice must be made between establishing an international system administered and enforced by an international body or tribunal, and the formulation of norms to be adopted and applied by each state as part of its municipal laws.

An international regime will have the merit of dealing with what is essentially an international risk[5] at the international level. In order to do so the regime will need to provide a forum for dispute resolution and a mechanism for enforcement. However, in the absence of domestic legislation and laws, the foundation for exercise of jurisdiction over private commercial entities will be lacking.

The alternative approach advocated by many authors and scholars is to harmonize the domestic laws of all countries in respect of damage arising from activity in outer space. Ideally this will result in a level of certainty about the risk of liability required for commercial space activity. Harmonization will also ensure that private commercial entities can be made directly responsible and liable for damage arising from commercial activity in outer space.

States may find it desirable for a number of reasons, not least to encourage space commercialization, to limit the overall exposure of commercial entities to liability from outer space activity. This can be achieved under the domestic laws through government insurance or underwriting the amount of liability in excess of a fixed sum. However, if the new scheme is to replace the current, albeit inadequate international liability of States under the OST and the Liability Convention[6], States must assume at least the same level of unlimited liability for their own actions, as opposed to those of nationals and residents, as they do currently.

A HYBRID SOLUTION

All space activity will, at least initially, be associated with an object put into space[7] that requires assignment of frequencies to communicate with telemetry, tracking and control stations and to communicate information of some kind to an earth station. Geostationary satellites will also have assigned orbital slots and non-geostationary satellites will have identified orbital characteristics[8].

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5 "Because of the nature of space activity, the risk is really international", Kerrest, Armel, *Remarks on the Responsibility and Liability for Damages Caused by Private Activity in Outer Space*, Proceedings of the Fortieth Colloquium on The Laws of Outer Space (1997) 134 at 137.

6 The Outer Space Treaty, OST, Treaty on Principles Governing The Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, 1967; The Convention on International Liability for Damage Caused by Space Objects, 1972.

7 The use of the term "space object" is avoided because of the uncertainties associated with that term.

8 ITU Radio Regulations, Appendix 4, Section B4.

It is possible to extend the remit of the ITU[9] to make space frequency allocations subject to requirements of assumption of liability by the state and the operator of the relevant object.

The advantage of such a regime is that it can cover all entities whose objects in space use the frequency spectrum, without the need for a new Treaty that may be acceded to by only a few states. In addition to its extensive application to the majority of states, liability linked with spectrum use can have a self-enforcing advantage in that the entity operating an object which has caused damage[10] will wish to meet its liability obligations in order to preserve priority over the spectrum assigned to it.

Such a regime does not, of course, remove the state from its scope or directly create international liability by the private entities operating the objects. At the conceptual level the regime would operate in a similar way to that of orbital allocations. An object placed at an orbital position[11] can only operate at specified frequencies while conforming to the designated orbital characteristics. In the same way, the ITU Regulations can be fashioned to provide that only those objects for which liability obligations are accepted can operate at the assigned frequencies.

Two issues that need to be addressed relate to objects at the end of their useful lives, and space debris. There also need to be provisions dealing with entities which cease to exist, for whatever reason. Objects that cease to operate and their component parts, including their debris, can be covered by imposing a continuing obligation for so long as there is potential for damage from the object. If associated with spectrum, liability should be structured to continue beyond the use of spectrum. It is not intended here to enter into a discussion of debris. However, liability for damage associated with debris is an important aspect of any liability regime.

Where the entity bearing the liability ceases to exist, the state should become primarily liable for any damage, or some form of insurance should be in place.

Further advantages of such a liability scheme include the certainty as to the identity of the liable entity. At the international level only one state is the assignor of the space station spectrum[12]. This will overcome the ambiguity and multiplicity of states that fall within the definition of a "launching state" under the present regime. It does not, of itself, extend liability to private entities.

Whether as a stand-alone treaty or as conditions attaching to spectrum assignment, the substance of the regime will be very similar. The end to be achieved is also similar. In both

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9 International Telecommunications Union.

10 For the definition of "damage" to be covered under the regime, see below.

11 The term "orbital position" is here used to include the orbital characteristics of satellites in non-geostationary orbits.

12 The assigned frequency is coordinated with other states through the ITU.

cases it is clear that a system of harmonized national laws has to result[13]. **[Ed Note: Moved from below, and heading "*The Liability for Damage*" deleted.]**

LIABLE ENTITY

Whether the harmonization or the hybrid approach is adopted, the regime will need to extend to private entities. Under the harmonization alternative, states party to the relevant international instrument will be required to make certain uniform provisions in their domestic laws to give effect to the international norms established by the instrument. There are numerous examples of such international instruments, such as Directives of the European Union[14] and copyright and other intellectual property Conventions[15].

The ITU Convention and its Regulations are binding only on the state. Frequency allotments[16] are made to the state for assignment[17] by the state to specific radiocommunications stations. Clearly, both the ITU and the state can attach conditions to the use of frequencies. Therefore, this approach does not differ in its direct binding effect from the harmonization alternative. The difference lies in the means by which largely the same result is secured. Expansion of the ITU mandate and association of liability with the use of the spectrum is likely to be more effective and extensive than the establishment of a new regime for harmonization.

There will be similar political and legal obstacles to overcome. The ITU has in recent years been criticized on numerous grounds. However, it has taken measures to meet the criticism and the participation of private commercial entities in many of its activities has made it a more vital and relevant organization than it had been for some years. Such participation also renders the ITU a more suitable forum for debating and establishing the regime for liability which is intended to create certainty for private commercialization of space activities.

Any new regime will need also to accommodate the growing trend in privatization of international organizations. Whereas under the current regime such organizations may bear liability for damage, once privatized they will not have the multi-state liability that attaches to participating states. Similarly, there have already been examples of satellites in orbit being transferred

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13 It has been suggested that "the first step in establishing a workable regime is to define the central terms of "damage", "fault", "cause" and "space object"." Maniatis, Dmitiri, *The Law Governing Liability for Damage Caused by Space Objects*, Annals of Air and Space Law, (1997), Vol XXII, 369 at 398. However, as will be seen, some of these terms can be avoided, although it is essential to have precise definitions of terms used.

14 The Directives ultimately derive their force from the Rome and the Maastricht Treaties.

15 These Conventions are only partially harmonizing in that they generally set minimum norms to which domestic laws need to conform and only in relation to certain rights and obligations; for example, see the Berne Convention on copyright.

16 "Allotment" is the process of designating a frequency for use in one or more countries or geographical areas under specified conditions; ITU Radio Regulations, Article 1.

17 "Assignment" is the government authorization for a radio station to use a radio frequency under specified conditions; ITU Radio Regulations, Article 1.

between entities of different nationalities[18]. This will increase[19] and the new regime will need to establish a means of transfer of liability to any new owner of the object, and possibly to determine the time such transfer occurs[20].

Identification of the liable entity will depend in part on the nature of the regime established. Harmonization would require that the liable entity be identified in terms appropriate to domestic legislation. Any Treaty would be expressed in terms of what domestic legislation the state parties agree to implement. Similarly, where liability is to be a part of the spectrum regime of the ITU, it should be formulated in terms that would require states to implement specified liability obligations through their licensing or regulatory procedures.

Another issue that needs to be resolved is that of any carried-over liability if the liable entity becomes insolvent or ceases to exist. One solution may be to require insurance cover for the period while potential liability exists. The costs of such insurance may act as a disincentive to commercialization of space activities. Alternatively, the state my be made the liable entity, leaving it free to pass-on such liability to other entities. A third, and possibly more desirable solution may be to leave each state to determine its own policy on providing government support, by way of providing insurance or underwriting liability beyond a given level[21].

To overcome the many uncertainties of the Liability Convention, it is desirable to identify the liable entity. Given that liability is to be associated with *space activity*, it remains to define for which of such activities a state or its relevant entities bear liability. The following definition is proposed:

Liable Entity	A state or person which conducts or procures a Space Activity which causes Damage

There will be circumstances in which more than one entity is liable for the damage caused by the same space activity, not least where one entity procures the conduct of such activity by another entity. Liability by more than one entity is not undesirable. For the third party sustaining damage there will be a choice of entities against whom to make a claim and the advantage of large resources to meet the claim.

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18 An example of the transfer of satellites in orbit occurred with the Marco Polo Satellites originally owned by British Satellite Broadcasting Limited, to Norwegian Telecom, later Telenor, and to Swedish Space Corporation and Nordiska Satellitaktiebolaget, later Telia, in 1992 and 1994 respectively.

19 von der Dunk, Frans G, *Commercial Space Activities: An Inventory of Liability - An Inventory of Problems*, Proceedings of the Thirty-Seventh Colloquium on The Laws of Outer Space (1994) 161 at 164.

20 The determination of time of transfer of liability between entities may be left to the private arrangements between them. To try and predetermine this fact could lead to anomalies and unnecessary complication of the liability scheme.

21 This is a policy pursued successfully in the United States, whereby private entities are required to make a limited reimbursement to the Government for any compensation to third parties paid by the US under the Liability Convention.

ACTIVITY COVERED

The present system of liability concentrates on damage caused by a "space object". A more appropriate approach would be to focus on damage arising from "space activity." This will obviate the need to define a "space object", and will broaden the scope of any regime to attach liability to those that have immediate responsibility for conducting space ventures. It will also provide a mechanism by which new operators of objects already in space can be held liable, without the need for special provisions specifically addressing transfers of such objects.

Clearly, the definition of "space activity" is critical to the proposed new regime. In reaching a final definition of this term the aim will be to ensure that there is no ambiguity in risk allocation[22] to any entity involved in space related activities.

The following definition is proposed:

Space Activity — The use, or the provision of facilities for the use, of the characteristics or environment of Outer Space for the conduct of any activity[23], including but not limited to placing or attempting[24] to place any person, animal or other life-form, or any other animate or inanimate object in Outer Space or making transmissions[25] in, to or from Outer Space. For the purposes of this Convention, Space Activity includes the provision of the location or the facilities from which to launch any person, animal or other life-form, or object into Outer Space or making transmissions to Outer Space; and continues until the time immediately after any such person, animal or other life-form, object and all parts of them have come to the earth's surface or ceased to exist.

It may be argued that such a definition will include those not engaged in space activity *per se*, for example, someone who transmits a laser beam into space. However, if such activity causes the malfunction of a satellite, thereby causing damage, it seems appropriate and logical that the party

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22 Maniatis, Dmitiri, *The Law Governing Liability for Damage Caused by Space Objects*, Annals of Air and Space Law, (1997), Vol XXII, 369 at 371.

23 This definition covers not only commercial but also state activity in space. It potentially extends to both peaceful and military activities.

24 The inclusion of attempted launches is intended to remove any uncertainty as to the liability of those who cause damage without succeeding to place an object into outer space.

25 Inclusion of making transmissions to outer space will bring into the liability net a large number of entities not otherwise involved with space activity. There is a degree of intent implied here, which will reduce the potential number of entities that would come within the scope of this definition. In practice the risk of damage from transmitters will vary according to the service in which they operate and the transmitting station's characteristics. Nevertheless, there is a policy decision to be made here as to the scope of the regime. For a discussion of the likelihood of claims arising from interference in the case of Mobile Satellite Systems, see zur Hausen, Henning, *Aviation, Telecommunications, and Frequencies: Will LEO Satellite Services Obstruct Planned GNSS?*, Air & Space Law, Vol XXII, No 3, June 1997, 114.

conducting the activity should bear liability for any damage. This definition further extends the scope of liability to cover activities such as Global Navigation Satellite Systems, GNSS, which by their nature need to be addressed at an international level[26].

Inclusion of "placing" an object in outer space as a space activity will cover not only objects launched into outer space, but also those created there. A possible necessary exclusion from liability associated with this part of the definition is to ensure that an individual giving birth to persons in outer space do not bear strict liability for them. This could be achieved by a proviso to the definition of space activity in the terms:

> Provided that the parents of a child born in outer space shall not, by virtue of the birth alone, be considered to be placing such child in outer space.

The attachment of liability to space activity rather than to a space object aligns liability for damage more closely with the responsibility of states for space activity under the OST[27]. The result is the expansion of the liability provision of the OST, which is linked to space objects[28]. It has been argued that under the present regime, where damage is not "caused "by" a space object, but by the space activity or by an activity partly using outer space", action for damages could be based on the responsibility of the state[29] under the OST.

DAMAGE

To establish liability for any damage the claimant will have to establish *causation* in every case. Causation is established by showing that the damage can be legally considered as the consequence of the relevant act, being a normal consequence of the act[30]. The damage that may result from such activity may be *direct* or *consequential*. A further distinction that needs to be made is whether any *consequential* or *indirect* damage is associated with *physical* damage resulting from the same incident or can be the basis for recovery of compensation without the need for any physical damage occurring[31].

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26 Henaku, B D Kofi, *The International Liability of the GNSS Space Segment Provider*, Annals of Air and Space Law, Vol XXI, 1996, 143 at 144.

27 OST, Article VI, under which "Sates Parties to the Treaty shall bear responsibility for national activities in outer space..."

28 OST, Article VII.

29 Kerrest, Armel, *Remarks on the Responsibility and Liability for Damages Caused by Private Activity in Outer Space*, Proceedings of the Fortieth Colloquium on The Laws of Outer Space (1997) 134 at 138.

30 Cheng, Bin, *General Principles of Law as Applied by International Courts and Tribunals*, (1953), at 246 and 353.

31 See Christol, Carl Q, *Space Law: Past, Present and Future*, (1991), at 221.

At issue is whether there can be recovery for *pure economic loss*[32]. Among the shortcomings of the Liability Convention and of the OST is the absence of any clear answer to these questions, due to the lack of a comprehensive definition of *damage*.

Both physical and pure economic loss occasioned by the relevant activity should be covered under the system. Many previous discussions of liability for damage have tended to focus on whether *indirect* or *consequential* damage may be recovered as well as *direct* damage[33]. However, a clear distinction has not always been made between such damage and pure economic loss. Whether the expenses of relatives looking after a person injured by fragments of a crashing space object are recoverable is an example of a question of indirect damage, as is the cost of cleaning-up radiation pollution caused by a space object. Such questions involve the concept of *remoteness* and *foreseeability*. These are also relevant issues in addressing the recoverability of pure economic loss[34].

The Liability Convention is the most explicit and extensive instrument of international law dealing with damage caused by space objects. There has been much discussion of the applicability of the Liability Convention to *indirect* damage. On the issue of indirect damages arising out of activity in outer space it has been said that the Liability Convention is silent by design. Such damages were first discussed by the UN *ad hoc* Committee on the Peaceful Uses of Outer Space ("COPUOS"). In the course of discussions "the subject was frequently raised in the context of a space object impacting the earth with indirect damages being some remote injury from that event. The thought of damages being *caused by* a space object still in space does not appear to have been part of the deliberations"[35]. A number of writers consider that indirect damage is not recoverable under the Liability Convention and some have expressed doubts about such recovery[36]. Others have gone so

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32 Spradling, Kevin K, *The International Liability Ramifications of the US "NAVSTAR" Global Positioning System*, Proceedings of the Thirty-third Colloquium on The Laws of Outer Space, 93 (1990); Mosteshar, Sa'id, *Responsibility for Pure Economic Loss Arising from Space Activity*, Proceedings of the Thirty-fourth Colloquium on The Laws of Outer Space, (1991) [For a full version of this paper contact Mosteshar@ucsd.edu].

33 See for example Christol, Carl Q, 74 A.J.I.L. 353 (1980); Matte, N, Aerospace Law, From Scientific Exploration to Commercial Utilization, 100 (1977); Diedriks-Verschoor, I H Ph, *The Convention on International Liability for Damage Caused by Space Objects*, Proceedings of the Fifteenth Colloquium on The Laws of Outer Space, 96 (1972); Gorove, Stephen, *Some Comments on the Convention on International Liability for Damage Caused by Space Objects*, Proceedings of the Sixteenth Colloquium on The Laws of Outer Space, 254 (1973).

34 As an example, assume a situation where a satellite fails to keep station and drifts into the transmission path of a broadcasting satellite owned by a broadcaster. The satellite blocks the broadcast transmissions for a sufficient period to prevent transmission or reception of some advertising. The income from those advertisements will be lost to the broadcaster. But the broadcasting satellite is in no way damaged. In these circumstances the loss to the broadcaster is clearly *caused by* the space object. The damage is direct in the sense that it is the natural and foreseeable consequence of the failure of the first satellite to keep station.

35 Spradling, Kevin K, *The International Liability Ramifications of the US "NAVSTAR" Global Positioning System*, Proceedings of the Thirty-third Colloquium on The Laws of Outer Space, 93 at 95 (1990); Christol, Carl Q, *The Modern International Law of Outer Space*, 95 to 100 (1982).

36 Foster, F W, The Convention on International Liability for Damage Caused by Space Objects, Canadian Y.B.I.L., Vol X (1972) 137; Diedriks-Verschoor, I H Ph, The Convention on International Liability for Damage Caused by Space Objects, Proceedings of the Fifteenth Colloquium on The Laws of Outer Space, 96 (1972); Gorove, Stephen, Some Comments on the Convention on International Liability for Damage Caused by Space Objects, Proceedings of the Sixteenth Colloquium on The Laws of Outer Space, 254 (1973); Matte, N, Aerospace Law, From Scientific Exploration to Commercial Utilization, 100 (1977); Christol, Carl Q, The Modern International Law of Outer Space, 96, 97 (1982).

far as to suggest that the absence of any mention of indirect damage in the Liability Convention was intended to leave the matter open for consideration in each case. They conclude that such damage is in principle recoverable[37].

The challenge here is to define damage in terms that covers both direct and indirect damage as well as pure economic loss. There may be a case for differentiating between direct and indirect damage, for example, by imposing strict liability for direct damage and fault based liability for indirect damage.

Founding liability on *space activity* assists in formulating a wider definition of damage. The following definition is proposed:

Damage	Loss of life, personal injury or other impairment of health; impairment of, or injury to property, or loss, including but not limited to pure economic loss; harmful contamination of property or of the environment; and harmful interference with any transmission.

The intent here is to cover all harm to the person and material and financial loss of any nature. Physical damage to or loss of chattel or realty is covered by "impairment of, or injury to property, or loss..." Inclusion of "pure economic loss" makes it clear that no physical damage need be shown in order to prove liability for damage. The specific inclusion of "harmful interference" in the definition of "damage" is probably not strictly necessary, since any loss arising from the interference will be covered as "pure economic loss".

HARMONIZATION OF LAWS

A PROPOSED CONVENTION

To identify the more fundamental changes from the current regime, and as a modest proposal for change, a new Convention is offered here. The new Convention will follow the format and general provisions of the Liability Convention, with changes to reflect the proposed approach. There will follow a modification of the new Convention, focusing on spectrum assignments as the basis of creating a liability regime.

Article I

In this Convention the following terms shall have the meaning indicated.

Active State	A state which is or whose nationals or persons resident within its jurisdiction are engaged in Space Activity
Claimant	A state and its nationals and persons resident within its jurisdiction that have suffered Damage caused by Space Activity[38]

[37] Christol, Carl Q, *The Modern International Law of Outer Space*, 97 (1982).

Damage	Loss of life, personal injury or other impairment of health; impairment of, or injury to property, or loss, including but not limited to pure economic loss; harmful contamination of property or of the environment; and harmful interference with any transmission
Liable Entity	A state or person who conducts or procures a Space Activity which causes Damage
Outer Space	The area including the moon and other celestial bodies more than 100 kilometers above the surface of the earth[39] or such other distance not less than 100 kilometers above the surface of the earth as may be adopted from time to time by resolution of COPUOS
Space Activity	The use, or the provision of facilities[40] for the use, of the characteristics or environment of Outer Space for the conduct of any activity, including but not limited to placing or attempting to place[41] any person, animal or other life-form, or any other animate or inanimate object in Outer Space or making transmissions in, to or from Outer Space. For the purposes of this Convention, Space Activity includes the provision of the location or the facilities from which to launch any person, animal or other life-form, or object into Outer Space or to make transmissions to Outer Space; Space Activity continues until the time immediately after[42] any such person, animal or other life-form, object and all parts[43] of them have come to the earth's surface or ceased to exist

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38 The Liability Convention excludes recovery of compensation for damage by participants in the relevant space activity. However, inter-party damages are an increasingly likely and important part of any recovery regime. Should it be thought otherwise, exclusionary words could be added to restrict or exclude such recovery.

39 As systems are developed and technology changes what has traditionally been regarded as in outer space may change. Such a change will affect liability in case of such activities as space transportation. The adoption of a definition of outer space can overcome uncertainties, but may also create inflexibility. Two solutions for overcoming any inflexibility are to define outer space in terms of distances from the surface of the earth as may from time to time be resolved by the United Nations Committee on Peaceful Uses of Outer Space, COPUOS, or to be left to each state to resolve by legislation. The latter is less attractive because of the disparities that can arise from state to state.

40 The provision of facilities is included to cover launch facility operators to correspond to the extended definition of "launching state" under the Liability Convention, Article I (c)(ii).

41 This expression is intended to include circumstances where a launch fails and no object reaches outer space.

42 If Space Activity were to cease any earlier, it would not be possible to hold the entity responsible for the activity liable for damage caused by a crash on the surface of the earth.

43 While any part of an item remains in outer space, in the form of debris or otherwise, recognizable and identifiable as such, the Space Activity continues, and therefore liability continues to attach for any resulting damage.

Article II

States shall adopt laws to secure that the state and other Liable Entities which are their nationals or are resident within their jurisdiction shall be liable to pay compensation for Damage caused by Space Activity as provided in this Convention.

Article III

1. A Liable Entity shall be strictly liable[44] for Damage caused by its Space Activity within or outside the jurisdiction of the Active State, except as provided in Paragraph 2 of this Article III[45].

2. In the event of Damage being caused to a person, property or activity situated or conducted in Outer Space, the Liable Entity shall be liable if Damage is due to the negligent or reckless conduct of its Space Activity[46].

3. Paragraph 2 of this Article III shall not apply where the Damage has resulted from Space Activities not conducted in conformity with international law including, in particular, the Charter of the United Nations and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

Article IV

1. In the event of Damage being caused by the Space Activity of one Liable Entity to the Space Activity of another Liable Entity and Damage being thereby caused to a third party Claimant, the two Liable Entities shall be jointly and severally liable to the third party Claimant[47] as provided in Articles II and III.

2. In all cases of joint and several liability referred to in Paragraph 1 of this Article IV, the burden of compensation for the Damages shall be apportioned between the Liable Entities in

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44 For a discussion of "absolute liability" and "strict liability" see Brownlie, Ian, *The Nature of State Responsibility*, State Responsibility, (1983), Ch III; See also Bender, R, *Tort Principles in Space*, Space Transport Liability, (1995).

45 The proviso in Paragraph 1, and Paragraph 2 will allow for different levels of liability, as under the present Liability Convention.

46 It can be argued that strict liability is the appropriate standard where a hazardous activity is undertaken. By the same token, others engaged in space activity will themselves be engaged in similarly hazardous activity and assume a measure of risk from the activities of others. However, unless the activity of the victim of damage has contributed to it, there seems little justification in principle not to afford the victim the same protection as others. The exclusion of strict liability for damage caused in outer space is in part due to the approach of the drafters of the Liability Convention. As Professor DeBusschere observes, "It appears that the drafters of the Liability [Convention] were primarily concerned with the issue of damage due to falling debris rather than liability for damage caused by space debris or orbiting satellites and other objects, since such damage seemed less likely to occur back in the late 1960s", DeBusschere, A G, *Liability for Damage Caused by Space Objects*, (1994) 3 J Int. L & Practice, 97 at 100.

47 The third party Claimant may be a national or resident of one of the first two states, as long as the Claimant was not engaged in the Space Activity giving rise to the Damage.

accordance with the extent to which they were negligent or reckless in the conduct of the relevant Space Activities. If the extent of the negligence or recklessness of these Liable Entities cannot be established the burden of compensation shall be apportioned equally between them. Such apportionment shall be without prejudice to the right of the third party Claimant to seek the entire compensation due to the Claimant from any or all of the Liable Entities which are jointly and severally liable[48].

Article V

1. Whenever in respect of any Damage there are two or more Liable Entities, they shall be jointly and severally liable for any Damage caused.

2. A Liable Entity which has paid compensation for Damage shall be entitled to a contribution by other Liable Entities. States and persons may conclude agreements regarding the apportioning among themselves of the financial obligation in respect of which they are jointly and severally liable. Such agreements shall be without prejudice to the right of a Claimant sustaining Damage to seek the entire compensation for Damage from any or all of the Liable Entities which are jointly and severally liable.

Article VI

1. Subject to the provisions of Paragraph 2 of this Article VI, exoneration from strict liability shall be granted to the extent that a Liable Entity establishes that the Damage has resulted either wholly or partially from negligence or from an act or omission done with intent to cause Damage in the conduct of a Claimant.

2. No exoneration whatever shall be granted in cases where the Damage has resulted from Space Activities not conducted in conformity with applicable municipal laws and international law including, in particular, the Charter of the United Nations and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

Article VII

The provisions of this Convention shall not apply to Damage caused by Space Activity to any person participating in that Space Activity[49].

Article VIII

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48 The last sentence of this Paragraph, which is included in Article IV, Paragraph 3 of the Liability Convention, seems redundant, Paragraph 1 already having established *joint and several* liability.

49 It is submitted that such an exclusion is not appropriate; See Note 37.

1. A Claimant who suffers Damage may present to a Liable Entity a claim for compensation for such Damage. If the Liable Entity has not paid, within a period of six months, any sum agreed or determined to be due as compensation for such Damage, the Claimant shall be entitled to make a claim for compensation as provided in Article IX[50].

2. States shall waive any claim of sovereign immunity in respect of claims by Claimants.

Article IX

1. A claim for compensation for Damage may be brought in the courts of any state with appropriate jurisdiction over the subject matter and over the Liable Entity.

2. States shall establish substantive and procedural rules to enable a Claimant to bring and prosecute a claim for compensation for Damage.

3. States shall establish independent tribunals and judicial regimes for the hearing and adjudication of claims by Claimants. Such regimes shall include independent and impartial appeals procedures.

Article X

1. Any limitation period for claims for compensation for Damage shall be not less than two years following the latest of the date of the occurrence or knowledge of the occurrence of the Damage or the identification of the Liable Entity. Such limitation period may commence on the date on which the Claimant could reasonably be expected to have learned of the facts through the exercise of due diligence.

2. Any time-limits for making claims in respect of any Damage shall permit the Claimant to revise the claim and submit additional documentation after the expiration of such time-limits until at least one year after the full extent of the Damage is known.

Article XI

1. The courts of the state or the place of residence or nationality of the Claimant and of the Liable Entity shall have jurisdiction over any claim in respect of Damage. Presentation of a claim for compensation for Damage shall not require the prior exhaustion of any other local remedies which may be available to a Claimant in the state in which the claim is made.

2. Nothing in this Convention shall prevent a Claimant from pursuing a claim in the courts or administrative tribunals or agencies of any other state with jurisdiction over the subject matter and parties to the claim. A Claimant shall not, however, be entitled to present a claim in respect of the same Damage for which another claim is being pursued in the courts or administrative tribunals

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50 It is doubtful that under a domestic law scenario, with clear rights of enforcement, a provision such as Article VIII is necessary or desirable. It is included here to provide an easy comparison with the Liability Convention.

or agencies of a state or under an international agreement which is binding on the states concerned.

Article XII

The compensation which the Liable Entity shall be liable to pay for Damage shall be determined in accordance with the principles of justice and equity, in order to provide such reparation in respect of the Damage as will restore the Claimant to the condition which would have existed if the Damage had not occurred.

Article XIII

[Ed Note: Please check for consistency of indentation throughout.]

1. In this Convention references to states shall be deemed to apply to any international intergovernmental organization which conducts Space Activities if the organization declares its acceptance of the rights and obligations provided for in this Convention and if a state member of the organization is a State Party to this Convention[51].

2. States members of any such organization which are States Parties to this Convention shall take all appropriate steps to ensure that the organization makes a declaration in accordance with Paragraph 1 of this Article XIII.

3. If an international intergovernmental organization is liable for Damage by virtue of the provisions of this Convention, that organization and those of its members which are States Parties to this Convention shall be jointly and severally liable; provided, however, that:

[Ed Note: Please indent paragraphs a, b and c that follow.]

(a) Any claim for compensation in respect of such Damage shall be first presented to the organization;

(b) Only where the organization has not paid, within a period of six months, any sum agreed or determined to be due as compensation for such Damage, may the Claimant invoke the liability of the members which are States Parties to this Convention for the payment of that sum;

(c) Limitation periods referred to in Paragraph 1 of Article X shall be extended by six months.

4. Any claim, pursuant to the provisions of this Convention, for compensation in respect of Damage caused to an organization which has made a declaration in accordance with Paragraph 1 of this Article XIII shall be made by the organization or by a state member of the organization which is a State Party to this Convention.

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[51] The requirement under the Liability Convention that a majority of State Members be Parties to the Convention has prevented the application of the Convention to international organizations. Although they have made the appropriate declaration and a significant number of their Members are Parties to the Convention, the Convention does not apply because not a majority of their Members are Parties to the Liability Convention.

Article XIV

1. The provisions of this Convention shall not affect other international agreements in force in so far as relations between the States Parties to such agreements are concerned.

2. No provision of this Convention shall prevent states from concluding international agreements reaffirming, supplementing or extending its provisions.

Articles XV et seq

Formal and procedural provisions

[Ed Note: Please check for consistency of headings and centering or other justification throughout.]

HYBRID APPROACH

LIABILITY ASSOCIATED WITH SPECTRUM

As already indicated, the new Convention proposed above will bring greater clarity and some uniformity to the treatment of liability by different states. However, the suggested solution to impose liability associated with the assignment of spectrum and orbital parameters has several attractions, not least that it will extend the liability regime to a larger number of states than would be the case with a new Convention.

To associate liability for damage with spectrum, it would be necessary for allotments and assignments of spectrum to carry obligations that are similar to those outlined above. To impose liability beyond the use of the spectrum, the conditions must attach on assignment and continue until the Space Activity, in the sense defined, comes to an end.

THE ALLOTMENT OF FREQUENCIES FOR SPACE ACTIVITY

To associate conditions effectively with spectrum assignment there must be changes to the ITU Convention and Radio Regulations. Assuming such changes are made, the Regulations effecting liability may be formulated in terms similar to the new Convention just considered, with appropriate alterations to take account of the different basis on which liability could arise. A starting point for a model may take the following form.

ADDITION TO RADIO REGULATIONS

LIABILITY REGULATION

The assignment of frequencies for Space Radiocommunications which are used or are to be used in the conduct of any Space Activity, shall be subject to the conditions and provisions of the Liability Appendix.

LIABILITY APPENDIX

Article I

In this Appendix the following terms shall have the meaning indicated.

Active Member	A Member which is or whose nationals or persons resident within its jurisdiction are engaged in Relevant Space Activity
Assigning Member	A Member whose Administration assigns frequency for Space Radiocommunications to a Relevant Station
Claimant	A Member and its nationals and persons resident within its jurisdiction who have suffered Damage caused by Relevant Space Activity
Damage	Loss of life, personal injury or other impairment of health; impairment of, or injury to property, or loss, including but not limited to pure economic loss; harmful contamination of property or of the environment; and harmful interference with any transmission
Liable Entity	An Assigning Member or person whose Relevant Space Activity causes Damage
Relevant Space Activity	Space Activity which involves, or has at any time involved, in any way, a Relevant Station
Relevant Station	Station to which a frequency assignment has been made by an Assigning Member and which is used in the conduct of any Space Activity to communicate any message, image, sign, command data or results in, to and from Outer Space
Outer Space	The area including the moon and other celestial bodies more than 100 kilometers above the surface of the earth[52] or such other distance not less than 100 kilometers above the surface of the earth as may be adopted from time to time by resolution of *the ITU*[53]
Space Activity	The use, or the provision of facilities for the use, of the characteristics or environment of Outer Space for the conduct of any activity, including but not limited to placing any person, animal or other life-form, or any other animate or inanimate object in Outer Space or making transmissions in, to or from Outer Space. For the purposes of this Appendix, Space

[52] See Note 38.

[53] The decision could be left to a suitable technical Committee, or the Plenipotentiary.

Activity includes the provision of the location or the facilities from which to launch any person, animal or other life-form, or object into Outer Space or to make transmissions to Outer Space; Space Activity continues until the time immediately after any such person, animal or other life-form, object and all parts of them have come to the earth's surface or ceased to exist

Space Radiocommunications Any radiocommunications involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in Outer Space[54]

Article II

1. Liable Entities shall be liable to pay compensation for Damage caused by Relevant Space Activity.

2. A Liable Entity whose negligent or reckless conduct of Relevant Space Activity causes Damage shall lose all rights and entitlements under the Radio Regulations in respect of any frequency assigned to the Relevant Station.

Article III

1. A Liable Entity shall be strictly liable for Damage caused by its Relevant Space Activity, except as provided in Paragraph 2 of this Article III[55].

2. In the event of Damage being caused to a person, property or activity situated or conducted in Outer Space, the Liable Entity shall be liable if Damage is due to the negligent or reckless conduct of the Relevant Space Activity[56].

3. Paragraph 2 of this Article III shall not apply where the Damage has resulted from Relevant Space Activities not conducted in conformity with international law including, in particular, the Convention and the Radio Regulations of the International Telecommunications Union, the Charter of the United Nations and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

Article IV

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54 This and other related terms are defined in the ITU Radio Regulations, Article 1. In particular, Space Station is defined as: A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.

55 See Note 44.

56 See Note 45.

1. In the event of Damage being caused by the Relevant Space Activity of one Liable Entity to the Relevant Space Activity of another Liable Entity and Damage being thereby caused to a third party Claimant, the Liable Entities shall be jointly and severally liable to the third party Claimant[57] as provided in Articles II and III.

2. In all cases of joint and several liability referred to in Paragraph 1 of this Article IV, the burden of compensation for the Damages shall be apportioned between the Liable Entities in accordance with the extent to which they were negligent or reckless in the conduct of the Relevant Space Activities. If the extent of the negligence or recklessness of these Liable Entities cannot be established the burden of compensation shall be apportioned equally between them. Such apportionment shall be without prejudice to the right of the third party Claimant to seek the entire compensation due under this Convention from any or all of the Liable Entities which are jointly and severally liable[58].

Article V

1. Whenever in respect of any Damage there are two or more Liable Entities, they shall be jointly and severally liable for any Damage caused.

2. A Liable Entity which has paid compensation for Damage shall be entitled to a contribution by other Liable Entities. Members and other Liable Entities may conclude agreements regarding the apportioning among themselves of the financial obligation in respect of which they are jointly and severally liable. Such agreements shall be without prejudice to the right of a Claimant sustaining Damage to seek the entire compensation due under this Appendix from any or all of the Liable Members which are jointly and severally liable.

3. A Member from whose territory or facility a Space Activity is conducted shall be regarded as conducting a Relevant Space Activity.

Article VI

1. Subject to the provisions of Paragraph 2 of this Article VI, exoneration from absolute liability shall be granted to the extent that a Liable Entity establishes that the Damage has resulted either wholly or partially from negligence or from an act or omission done with intent to cause Damage in the conduct of a Claimant.

2. No exoneration whatever shall be granted in cases where the Damage has resulted from Relevant Space Activities not conducted in conformity with international law including, in particular, the Convention and the Regulations of the International Telecommunications Union, the Charter of the United Nations and the Treaty on Principles Governing the

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57 See Note 46.

58 See Note 47.

Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

Article VII

The provisions of this Appendix shall not apply to Damage caused by Relevant Space Activity to any person participating in that Relevant Space Activity.

Article VIII

Rules for claims and waiver of sovereign immunity.

Article IX

Jurisdiction provisions.

Articles X et seq

[Ed Note: Please note the following sentence is not a heading and is not in italic.]
Other Procedural and formal provisions.

CONDUCT OF SPECTRUM MANAGEMENT

Two further issues need to be considered. First, states may privatize their frequency management operations. However, as long as the international spectrum regime of allotments by the ITU continues, the liability scheme will not be affected. Second, the assigning Member and its nationals and residents may have no other involvement in the space activity. In such circumstances, again, as long as there is an enforcement mechanism for licence conditions, the proposed scheme need not be altered.

CONCLUSION

The two solutions proposed here share the common objective of imposing liability on public and private entities involved in space activities for damage arising from such activities. They differ in the rules by which those entities are made liable for damage. However, in both cases the state has to institute laws, or licensing conditions, for the recovery of compensation for damage caused by space activity.

Clearly, there are numerous approaches that can be taken in establishing a liability regime suited to the era of commercial space activity. The intent of the present offering is to suggest a starting point for the development of a suitable regime. The final solution may, and in most probability will, be very different from those suggested here.