occurred or remains unmeasurable (such as general damage to the environment)[11]. Therefore, might the Soviet Union honor Canada's claim, such action could possibly be based on Article VII of the Outer Space Treaty, on uncodified principles of international law, on political accommodation, but *not* on the Rescue and Return Agreement or on the Liability Convention.

In retrospect the crash of Cosmos 954 in the Northwest Territories might induce the international legal community at large and the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space in particular, to consider the following questions:

1) Perhaps the definition of "damage" as contained in Article I (a) of the Liability Convention ought to be broadened so as to include costs incurred by States in *preventing* surface damage to occur from satellite crashes, especially when one is dealing with potential damage from an ultrahazardous object like a nuclear powered satellite;

2) Perhaps the international legal community ought to ban nuclear powered satellites from earth orbit altogether or at least agree on internationally applicable safeguards against the potential dangers of such satellites;

3) The Rescue and Return Agreement favors cooperation between the launching State and the State where a spacecraft or its component parts are found. In the case of Cosmos 954 this would have meant cooperation between the Soviets and the Canadians. In fact, no Soviet-Canadian cooperation occurred. In accordance with the world's political realities it was rather the United States and Canada which cooperated in the search and rescue of Cosmos' debris;

4) The United States, through the North American Air Defense Command (NORAD) and the Soviet Union were aware of the possible reentry, disintegration and crash of Cosmos 954 long before the crash in the Northwest Territories actually occurred. It seems that the Canadian Government was only notified of the potential danger represented by the Cosmos shortly before its crash on January 24, 1978. Through the good services of the United Nations' Secretary General, the international legal community ought to set up a multilateral warning system, whereby launching States or States equipped with satellite tracking stations are required to notify other States of potential surface dangers represented by satellites in earth orbit.

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[11]The narrow definition of "damage" as contained in Article I (a) of the Liability Convention was already recognized as "one of the major problem areas" of the Convention in a Staff Report of 1972 prepared for the Committee on Aeronautical and Space Sciences of the United States Senate. See U.S. Sen. Comm. on Aeronautical Space Sciences, 92nd Cong., 2d Sess. Report on Convention on International Liability for Damage Caused by Space Objects: Analysis and Background Data, 23 (Comm. Print., May 1972).

MEASURING DAMAGES UNDER THE CONVENTION ON INTERNATIONAL LIABILITY FOR DAMAGE CAUSED BY SPACE OBJECTS +

*Ronald E. Alexander**

"Contrary to some early scientific expectation that fragments and parts of objects placed in orbit or otherwise sent to outer space would burn up in the atmosphere prior to reaching earth unless designed and made for reentry, some have fallen back to earth as solid pieces. Even though the incidence of damage has been low. . . as the number of objects put into outer space increases, the probability of damage from falling debris might increase."[1]

Although the semantics belie the potential tragedy which can result from such falling debris, the validity of the above quoted observation was irrevocably established on January 21, 1978 when the nuclear powered Soviet satellite fell from orbit into the Canadian forests.[2] Although Cosmos 954 grounded in a relatively unpopulated area, it could just as readily have impacted in a major urban area with the attendant injury and destruction to lives and property.

It has long been recognized that such space flights and exploration pose a risk not only for direct participants, but also for all those who remain earthbound.[3] This risk of injury has in turn produced a multitude of unresolved questions concerning liability. For example, who should bear liability for injury? Should that liability be dependent upon fault notions or be based upon strict liability? What interests should be protected? What remedies ought to be available to protect those interests? If the available remedies

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+ This article is an elaboration of the author's presentation at the University of Akron School of Law, May 2, 1978.

[1]U.S. Sen., Report, on The Convention on International Liability for Damage Caused by Space Objects Launched into Outer Space - Analysis and Background Data, 92d Cong., 2d Sess. 6 (1972). [hereinafter cited as Senate Rept.]

[2]Satchell, *Can Our Space Scientists Keep Skylab Aloft,* Akron Beacon Journal, May 7, 1978, at 4 (Parade Magazine).

[3]"Since injury or damage might result from a launching, flight and return to earth of various kinds of space vehicles or parts thereof, a number of problems exist with respect to defining and delimiting liability of the launching State and other States associated with it in the space activity *causing injury or damage.*" Report of the *Ad Hoc* committee on the Peaceful Uses of Outer Space of its 14th Sess., UN Doc. A/4141, July 14, 1959. (Emphasis added).

include damages, then how should such awards be measured? And finally, should damage liability be limited in amount?[4]

Some of these questions were initially addressed in the Outer Space Treaty.[5] That treaty established the general principle that the launching state has a liability for the injury caused to persons by its launched objects.[6] One progeny of the Outer Space Treaty, the Convention on International Liability for Damage Caused by Space Objects[7] was conceived to flesh out this principle: "to establish international rules and procedures concerning liability for damage caused by the launching of objects into outer space and to insure, in particular, the prompt and equitable compensation for damage."[8] Its legislative history evidences further an intent that the Liability Convention "contain provisions which would insure the payment of a full measure of compensation to victims and effective procedures which would lead to the prompt and *equitable settlement of claims.*"[9]

Although it is not the purpose of this paper to detail the Liability Convention's procedure for processing claims, it is important to note that the process contemplates settlement through diplomatic negotiations or via a Claims Commission. If diplomatic negotiations fail to produce a settlement, then the party States appoint a Claims Commission to process that claim.[10] Whether settlement is reached through diplomatic negotiations or as a result of the Claims Commission's determinations, the final award must achieve two goals specifically fixed by the Liability Convention: (1) compensation must be determined "in accordance with international law and the principles of justice and equity";[11] and (2) the damage award must "restore the person. . . to the condition which would have existed if the damage had not occurred."[12] The issue of applicable

[4] *See*, Senate Rept., *supra* n. 1 at 7.

[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 UST 2410, TIAS No. 6347.

[6] *Id.* at Art. VII. It has stated that "this principle . . . acknowledges the following varieties of the connection between the cause of damage and the State responsible for *compensation:* (1)launching (2)procuring the launching; and (3)putting the territory or facilities at the disposal for launching." Senate Rept. *supra* n. 1 at 8. (Emphasis added).

[7] Convention on International Liability for Damage Caused By Space Objects March 29, 1972 (1973) 24 U.S.T. 2389, T.I.A.S. 7762 (hereinafter cited as Liability Convention).

[8] G.A. Res. 2601B (XXIV) of Dec. 16, 1969.

[9] G.A. Res. 2733B (XXV) of Dec. 16, 1970. (Emphasis added). This principle was reaffirmed in G.A. Res. 2777 (XXVI) of Nov. 29, 1971.

[10] Art. XIV, Liability Convention.

[11] *Id.*, Art. XII

[12] *Ibid.*

law (that of the claimant State or the State with potential liability) was apparently a major hurdle to reaching a final draft of the Liability Convention. "Since no agreement was reached on the applicability of the national law of a single State, accord was finally reached on the general principles. . . that the compensation for damage 'shall be determined in accordance with international law and the principles of justice and equity, . . .'"[13] Even though the Liability Convention omits a rigid rule for resolving the question of applicable law, the statement of the two remedial goals may have mitigated the possible adverse consequences of this omission. By noting that compensation is to be determined by applying the principles of justice and equity, the drafters of the Convention have dictated that regardless of the applicable law ultimately selected during the award-fixing procedure, application of that law must achieve equity and justice.

The phrase "justice and equity" makes clear that the term "equity" is used in its popular sense to signify moral justice and not in an Anglo-American legal sense.[14] As one scholar has noted, in this "general juristic sense, equity means the power to meet the moral standards of justice in a particular case by a tribunal having discretion to mitigate the rigidity of the application of strict rules of law so as to adapt relief to the circumstances of the particular case."[15] Indeed, "the need of principles of discretion in applying legal precepts and remedies, of dispensing from strict application of rules under special circumstances or in unusual relations. . . is even more imperative under the complicated and involved relations and circumstances of an increasingly crowded world."[16]

What standard of compensation will do justice to an injured party in the event of injury from falling space objects? At least that measure which will fulfill the Convention's second remedial goal: a measure of relief which will restore the injured persons "to the condition which would have existed if the damage had not occurred."[17] Perhaps in recognition that the most likely injury resulting from a falling space object cannot be remedied by specific restoration of the *status quo ante,* the drafters of the Liability Convention elected instead substitutionary relief. That is, compensating the

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[13] *Senate Rept., supra* n. 1 at 19.

[14] *See,* de Funiak, Handbook on Modern Equity § 1 (2 ed. 1956).

[15] McClintock, McClintock on Equity 1 (2 ed. 1948).

[16] Neuman, Equity in Law: A Comparative Study 10 (1961).

[17] Art. XII, Liability Convention.

injured person for the injury to his person or property.[18] A third remedy not addressed in the Convention is the award of nominal damages in declaration of an injured person's rights.[19] The Liability Convention's silence as to nominal damages need not preclude their availability. The goals of equity and justice could permit an award-making tribunal to determine that the rights of an injured party had been wrongfully infringed by the space object's launching State.[20] The allocation of fault through such a declaration of rights would serve little purpose, however, in light of another provision of the Liability Convention.

That provision states that "[a] launching State shall be absolutely liable to pay compensation for damages caused by its space object on the surface of the earth. . ."[21] Neither negligence nor other standards of fault need be proven to produce a remedial recovery. All that need be established is the presence of the requisite damages. The Convention defines "damage" to mean "loss of life, personal injury or impairment of health, or loss of or damage to property of States or persons, natural or juridical, or property of international intergovernmental organizations."[22] In order to explore each of these several categories of "damage" to determine what measure of recovery would be sufficient to do justice and to also restore the injured person to the condition which would have existed but for the injury, assume that the space object landed on real property owned by Mr. Harry Smith. Both Mr. Smith and Mr. Bob Jones were standing on that property at the moment of impact by the space object. Both Mr. Smith and Mr. Jones sustained personal injuries as a result of the impact. Both were hospitalized and received medical treatment over the next several weeks. Mr. Smith eventually died from his injuries, survived by his wife and three minor children. Further assume that the launching state has absolute liability in this situation. But who is the proper claimant(s)? Had Mr. Smith lived, he could have asserted a compensable claim for his personal

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[18] "[T]he law of torts attempts primarily to put an injured person in a position as nearly as possible equivalent to his position prior to the tort. The law was able to do this only in varying degrees dependent upon the nature of the harm. Thus, where the plaintiff has been harmed in body or mind, money damages are no equivalent but are given to compensate the plaintiff for the pain or for the deterioration of the bodily structure. . .in other situations, as where there has been harm to earning capacity, the law can indemnify the plaintiff for pecuniary loss, such indemnity not being the exact equivalent but one which approximates the pecuniary harm which the injured person has suffered or is likely to suffer in the future." Restatement of Torts, § 901, comment *a.*

[19] *Id.* at §907. *See also,* York & Bauman, Remedies, Cases and Materials 2-3 (2d ed. 1973).

[20] The United States Supreme Court has very recently reaffirmed the importance of nominal damages as a vehicle for the declaration of rights of aggrieved persons. *Carey v. Piphus,* 98 S. Ct. 1042, (1978). The court also noted that an award not to exceed one dollar would accomplish this remedial goal. *Id.* at p. 1054. *See also,* Dobbs, Law of Remedies, § 3.8, (1973); McCormick, Law of Damages, §§ 20-22 (1935).

[21] Art. II, Liability Convention.

[22] Art. I(a), Liability Convention.

injury. Does that claim die with Mr. Smith? Or does the Liability Convention revive it? What of Mr. Smith's surviving family? May they bring an action for their injury resulting from the loss of his life?

Most states of the United States today resolve these questions by means of statutes ordinarily labeled wrongful death statutes and survival statutes.[23] Wrongful death statutes permit the surviving dependents to recover for their losses arising from the death, while a survival statute revives and vests in the decedent's estate the claim which the decedent could have asserted had he lived. A few states have so-called "hybrid statutes" which permit a measure of recovery equaling the combined recoveries permitted under both wrongful death and survival acts.

The Liability Convention does not tie the award for loss of life to the scheme of the particular state of the United States where a space object might impact. Thus a representative of the decedent's estate may recover as under a survival statute. Such an award could include compensation for the decedent's medical expenses between the time of injury and his death, for wages lost while unable to work as a result of the injury. for his funeral expenses, and perhaps for his pain and suffering. While the Liability Convention does not explicitly permit the recovery for the decedent's pain and suffering in the event those injuries subsequently cause his death, it does permit a recovery for "impairment of health" where a claimant suffers *personal injury*. Since impairment of *physical* health constitutes "personal injury," the Convention's reference to impairment of health must relate instead to impairment of emotional or mental health. This provision thus seems to permit recovery for the injured person's pain and suffering if he lives, and probably would allow a like recovery even when he subsequently dies of the injuries.

The injured person who subsequently dies from those injuries is not the only party who may suffer mental anguish as a result of his injury. A decedent's survivors also suffer grievous emotional anguish from their loss of a loved one. Once again the Liability Convention is silent concerning possible recovery for this type of "damage" or loss. Indeed, the Liability Convention does not address the broader question of whether a decedent's surviving family are proper claimants. Yet their loss is more immediate and real than that of the decedent's estate. If the deceased member was the wage earner for the family, then his demise may result in loss of family income, and the attendant financial support of his surviving spouse and children. Loss of inheritance is another element of injury suffered by the survivors. But for his death, the decedent may have left an estate to be inherited at his death by his family. Yet his untimely death will preclude this possible contribution.[24] The survivors may also have paid part or all of the decedent's medical expenses and even the funeral costs. Only if the survivors are

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[23] *See generally*, Dobbs, Remedies §8.2 (1973).

[24] *Id.* at§ 8.3.

permitted to recover these several measures of loss will the Liability Convention serve its goal of moral right.

In the above hypothetical both Mr. Smith and Mr. Jones suffered personal injury, a compensable damage under the Liability Convention. As already noted, the losses produced by personal injury may include medical and hospital expenses, and lost wages or lost earning capacity. Where the injured person fully recovers from his injuries, his lost income will be incurred for an identifiable fixed period. In some situations, however, the injury may be so debilitating as to permanently limit or altogether preclude further ability to work. The Liability Convention does not speak to such future damages explicitly, but it does contain a statute of limitations which contemplates situations where the "full extent of the damage may not be known."[25] It is unclear whether such situations will result in an extension of the time for an initial claim or merely an extension *after* filing for discovering the full extent of prayed-for recovery. What is made clear, however, is that the Convention does permit recovery of damages not fully measurable at the time a claim is asserted. This is precisely the circumstance of future damages. Thus, if an injured person can establish that his injury permanently impairs his ability to work, the Liability Convention may permit recovery of such future damages.

As already stated, the Liability Convention includes impairment of emotional or mental health as a compensable injury. Still remaining is the practical problem of measuring such a recovery. As has been noted by a prominent scholar "it seems clear that the damages for pain and suffering are not compensation in any ordinary sense that they make the plaintiff whole or replace what has been lost, since damages are not pecuniary and since there is no market in pain and suffering by which the damages could be estimated."[26] How this recovery will be measured is no more definitely defined by the Liability Convention than that it be just and equitable. The Convention's second goal of restoring the injured person to the condition which would have existed without the injury is clearly inapplicable since a money award can never restore an earlier emotional state of mind nor eradicate the memory of suffering.

Many times a person who has suffered personal injury will be partially compensated for his loss by some independent source. Whether that source is private insurance, a state compensation scheme, or from a private benefactor, such compensation also serves to partially restore the injured person to the position occupied prior to the injury. The Liability Convention does not address that situation where some collateral source may partially accomplish this same remedial goal of the Convention. Should all such collateral benefits be subtracted from the claimant's recovery under the Convention? Would justice be served by subtracting insurance benefits which had been derived from a policy which had been paid for by the injured person? Or should only those collateral

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[25] Art. X, Liability Convention.

[26] *See,* Dobbs, Remedies 545 (1973).

benefits be subtracted which were rendered by some source to which the injured person had neither paid nor contributed?

There is a fourth remedial measure not mentioned in the Liability Convention. This measure, punitive damages, has been defined as "damages, other than compensatory or nominal damages, awarded against a person to punish him for his outrageous conduct"[27] or to deter similar acts by others. While it is difficult to conceive that a diplomatically negotiated compensatory award would ever contain an agreed element of punitive damages, it is possible that a claims commission might consider the appropriateness of such a remedy.

It is generally agreed that punitive damages are awarded due to the wrongdoing party's culpable state of mind. The requisite degree of cuplability is often described as "malice." Malice is in turn generally defined as evil intent or reckless disregard of the rights of the injured person. The Liability Convention does contemplate a situation where one State may act with the "intent to cause damage."[28] The Convention provides that a launching state will be exonerated from absolute liability in the event that it can establish that the damage caused by its space object was really the result of the claimant State's act or omission done with intent to cause damage. The Convention further provides, however, that no exoneration can be granted "in cases where the damage has resulted from activities conducted by a launching State which are not in conformity with the 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."[29] If a claims commission were to refuse to exonerate a launching state for its failure to comply with such international law, that finding of failure would approach the standard of malice which is often sufficient to justify an award of punitive damages. If the claims commission further found that the purposes of punitive damages to punish or deter would be served, then that commission might well designate an award that included a measure of punitive damages. While such a measure might constitute a "damage" arising from the launching State's activity, it would certainly go beyond the remedial goal of restoration.[30]

The above stated hypothetical found Messrs. Smith and Jones standing on Mr. Smith's realty at the time of impact. Assume now that situated upon that land was a

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[27] *See,* Restatement of Torts §908 (1939).

[28] Art. VI ¶ 1, Liability Convention.

[29] Art. VI, ¶ 2, Liability Convention.

[30] *See generally,* Ghiardi, The Case Against Punitive Damages, 8 Forum 411 (1972); Hodgin and Veitch, Punitive Damages Reassessed, 21 Internat. & Comp. Law Quart. 119 (1972); Exemplary Damages in the Law of Torts, 70 Harv. L. Rev. 517 (1957); Prosser, Handbook of the Law of Torts 13 (4th ed. 1971); McCormick, Damages Chp. 10 (1935); 22 Am. Jur. 2d, Damages §261 (1965).

manufacturing business owned by Mr. Smith. Within that structure were various items of personalty which were integral to that business. If the falling space object injured or destroyed the structure containing the manufacturing business and contaminated the land so as to limit or preclude any future use, Mr. Smith will have suffered substantial additional injuries. The Liability Convention allows recovery for "loss of or damage to property" without limiting the property concept to either realty or personalty. Thus, destruction or injury to even intangible personalty would produce a compensable loss under the Convention. Again not stated is the measure of any such compensation.

If the total property is only injured, can the property owner recover an amount equal to the diminution of that property's market value, the cost of restoring the property to its prior condition, or may he recover the larger of the two amounts regardless of whether he in fact repairs the injury?[31] Can he also recover for the loss of use of this property?[32] That loss would occur during the period necessary to repair.

How will such loss be measured? Will that measurement be limited to the market rental value of the property, to the owner's particular use value, to the lesser of the two, or the greater?[33] May the owner also recover interest on the loss?[34] If so, will the interest accrue from the date of injury or some later date?[35]

If the property is totally destroyed, similar measuring questions are presented.[36] Does the owner recover the property's value as measured by his purchase price, by its market value on the date of destruction, or on the date of award? Can be also recover for loss of use? Even if lost use or profits? is compensable, for what period are they recovered? That is, must the owner attempt to minimize this loss by promptly starting

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[31] "In addition to damages for the diminution of the value of the subject matter or other similar element of damages, the plaintiff is entitled to recover for any loss of which the defendant's act is the legal cause, either because the plaintiff is unable to use the subject matter until it is repaired or replaced or otherwise." Restatement of Torts §928, comments *(b)* (1939).

[32] Dobbs, Remedies §§5.3 (loss of use of realty) and 5.11 (loss of use of personal property) (1973).

[33] *Id.* at 333.

[34] *Id.* at §3.5.

[35] *Id.*

[36] "When a chattel is damaged beyond repair and is treated as destroyed, the usual measure of damage is the market value of the chattel at the time and place of destruction with adjustments for salvage value." *Id.* at 375. (footnotes ommited). *See also, Id.* at 379 (measure of damages where personal property is damaged rather than destroyed). *See generally,* McCormick, Damages, Chp. 19 (1935) (injury to interests in personal property).

anew his destroyed business?[37] What if he lacks sufficient capital to initiate such an endeavor until compensated by the launching State?[38] Is his award then limited to that period when a sufficiently capitalized hypothetical owner could have begun this business afresh?

The purpose of this paper has been to identify some of the questions which may arise when first applying the Liability Convention's remedial scheme to an actual injury. While few answers are proffered to the several questions raised, it must be remembered that any answers to the Convention's remedy questions should be arrived at through application of its stated remedial goals. To do less would defeat the obvious intention of the drafters to do justice for the *injured persons* when fashioning individual awards.

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[37]"(1) Except as stated in Subdivision (2), a person injured by the tort of another is not entitled to recover damages for such harm as he could have avoided by the use of due care after the commission of the tort.

(2) A person is not prevented from recovering damages for a particular harm resulting from a tort if the tortfeasor intended such harm or adverted to it and was recklessly disregardful of it, unless the injured person with knowledge of the danger of such harm intentionally or heedlessly failed to protect his own interests." Restatement of Torts § 918 (1939). At least one court has held that the injured party may not recover for preventable loss that the injured party could have prevented but for his financial inability to do so. Brandon v. Capital Transit Co., 71 A. 2d 621 (Mun. Ct. App. D.C. 1950).

[38]For one court's holding that the injured party's financial inability to mitigate does not preclude recovery for otherwise preventable loss, *see,* Valencia v. Shell Oil Co., 23 Cal. 2d 840, 140 P. 2d 558 (1944).

SUBSTANTIVE BASES FOR RECOVERY FOR INJURIES SUSTAINED BY PRIVATE INDIVIDUALS AS A RESULT OF FALLEN SPACE OBJECTS +

Lawrence P. Wilkins *

Space vehicles and their fragments have been falling back to earth since we began putting them up. So far no serious injury has been reported. The recent Cosmos incident sparked interest in the problem of whether, in the event a space object does cause harm in its return to the surface, there are adequate regimes for recovery for that harm.

My treatment of the problem will focus upon three different space objects: one owned by the hypothetical nation of Norka; one owned by the United States Government; and one owned by a private U.S. corporation. The person harmed will be presumed to be a U.S. national. It will be further presumed that Norka, like the U.S., is party to the Outer Space Treaty and the Convention on International Liability for Damage Caused by Space Objects (hereinafter Liability Convention).[1]

Liability of Norka:

Our U.S. national (for convenience, we'll call him Nat) injured by the space object of Norka can benefit from the provisions of the Liability Convention if he can establish that:

(1) he was damaged;

(2) the instrumentality was a space object;

(3) the damage was caused by the space object;

(4) Norka launched, procured the launch, or was the state from whose territory or facility the space object was launched.

Once Nat has established these prerequisites, Norka is absolutely liable without limitation on amount for his injuries.

To clear the first of these hurdles, Nat (or his representative) must show that he has sustained''. . . loss of life, personal injury or other impairment of health; or loss of or

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+ This article is an elaboration of the author's address at the University of Akron School of Law, May 2, 1978.

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[1] Convention on International Liability for Damage Caused by Space Objects, March 29, 1972 (1973) 24 U.S.T. 2389, T.I.A.S. 7762 (hereinafter cited as Liability Convention).

damage to property. . ."[2] Professor Alexander has focused his attention upon the ramifications of "damage" and what it may mean in varying contexts, so I will resist the temptation to launch my own foray of injury. Suffice it to say here, that Nat will recover for the injuries he suffers, so long as those injuries are incurred to the interests in his bodily integrity and property identified in the definition of "damage."

But how does he *establish* his damage? The Preamble to the Liability Convention enunciates and purports to satisfy ". . . the need to elaborate effective international rules and procedures concerning liability for damage caused by space objects. . .," and yet, inspection of the body of the document reveals a gap in those rules and procedures. Article IX instructs Nat that his government will submit a "claim for compensation" to Norka through diplomatic channels, and Article XIV tells him that if the diplomatic negotiations fail, a Claims Commission will be established so that the merits of the claim can be decided. But nowhere does the Liability Convention elaborate upon what constitutes a claim, what items of proof are to be required, and how the allegations are to be evaluated in order to determine if "damage" has indeed occurred. *Compensation,* it is said in Article XII, is to ". . . be determined in accordance with international law and principles of justice and equity. . .". But there is only silence as to how the merits of the assertion by Nat that he has suffered *damage* are to be determined.

Similar problems exist with respect to the items that pertain to the merits of Nat's claim that an instrumentality of Norka was a space object and that the space object caused Nat's damage. The Liability Convention provides only that ". . .'space object' includes component parts of a space object as well as its launch vehicle and parts thereof." Perhaps "space object" has a sufficiently understood meaning common to international states which can be further clarified upon demonstration of need by reference to the draft definitions considered by the Legal Subcommittee, but it is curious that the opportunity to elaborate upon that definition to avoid some obvious problems was passed up by that body. For example, whether articles carried by space vehicles but not specifically designed to move in outer space are to be subsumed in the term was not made clear in the final document.[3]

How strict will the requirements of proof be that the instrumentality was a space object? In the event of complete destruction of the instrumentality upon impact, will it be presumed in favor of Nat that it was indeed a space object, or will the presumption run in favor of Norka? It would seem essential that these kinds of rules be elaborated in such an important document that was so long in coming.

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[2] Art. I, Liability Convention.

[3] *See,* Foster, *The Convention on International Liability for Damage Caused by Space Objects,* The Can. Y. B. of Int'l. L. 137, 145, (1972). [Hereinafter Foster] Convention on International Liability for Damage Caused by Space Objects - Analysis and Background Data, Staff Report prepared for use of the Committee on Aeronautical and Space Sciences, U. S. Senate 92nd Congr. 2d Sess. (1972) at 25 [hereinafter Staff Report].

There may also be a problem of establishing ownership. Article II requires that Norka be a launching state, and Article I defines a launching state to be one ". . .which launches or procures the launching of a space object" or one ". . . from whose territory or facility a space object is launched." Nat should encounter no substantial difficulty in establishing that Norka is a launching state under most circumstances.[4] The intention of the drafters in the definition of "launching state" may well have been to impose liability upon a broad class of states responsible for putting space objects into orbit that later fall and injure people, but the inclusion of ". . . *its* space object" in the Article[5] which actually imposes that liability puts a cloud upon the effectiveness of the language to carry out that intention. The inclusion of that unfortunate three-letter word of inconsistency may provide fertile ground for contention in a contested case.

My background as a teacher of the common law regarding injuries to persons, property, and relations makes the temptation to deal with the issue of causation for the remainder of my alloted space nearly irresistible. But there are other issues to be raised, so I must be content here to suggest that the Liability Convention is seriously deficient in its failure to elaborate upon such problems as:

(1) does "cause" mean *direct* cause, or does it refer to one of a series of elements in a sequential claim of factual events?

(2) does "cause" mean that the instrumentality contributed to the injury of Nat, or does it mean that the instrumentality caused the event which ultimately resulted in Nat's injury?

(3) can Nat establish "cause" simply by showing he was in proximity to the space object when his injuries were incurred, or must he show that he sustained some physical impact with the object?

(4) will Norka escape if some "greater cause" was involved; does Nat have to negate such a possibility in his claim, or can he require Norka to establish the "greater cause" as a matter of affirmative defense?[6]

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[4] *But see,* Foster, *supra,* at 163-168.

[5] Art. II, Liability Convention.

[6] This question is at least partially answered by Article VI which would allow Norka to be exonerated from absolute liability if it ". . . establishes that the damage has resulted either wholly or partially from gross negligence or from an act or omission done with intent to cause damage on the part of a claimant state or of natural or juridical persons it represents." Query: does it exonerate from liability altogether, or simply from *absolute* liability; does it exonerate from liability to Nat in the event some other person represented by the U. S. besides Nat has engaged in the gross negligence or intentional conduct?

Hoping to have established that the liability of Norka, while *potentially* absolute and unlimited, is far from clear-cut, our attention may turn now to Nat's problems when he is injured by a U.S. space object.

Liability of the U.S. Government:

Since the Liability Convention excludes its coverage from situations where the damage is caused by a launching state to one of its nationals,[7] if Nat is injured by a fallen U.S. space object he must seek redress through other mediums. And, since the tradition of governmental immunity under our system of justice maintains that the government may not be sued without its consent, those mediums for recovery are carefully delineated. If Nat is equally as careful in his attempt to establish that his claim conforms to those delineations, he may obtain recovery.

The Federal government has given its consent to be sued for ". . . money damages. . .for injury or loss of property, or personal injury or death caused by the negligent or wrongful act or omission of any employee. . .".[8] A serious difference between Nat's position vis-a-vis his own government and that with respect to Norka is immediately made apparent; Nat has to prove fault to recover here. The words of the statute "negligent or wrongful act" have been interpreted to mean that liability will be imposed only upon the theory that the employees of the government have failed to exercise ordinary care or have engaged in some other conduct constituting misfeasance or malfeasance.[9] The magnitude of this hurdle in a space object accident is superlative. Nat will have to focus upon specific conduct, in the myriad of human activity that is involved with space operations, and establish that it was sufficiently faulty to make the U.S. government answerable. That task is by no means made easier by the fact that much of the human activity involved and the documentation of it are controlled by tight security measures, limiting Nat's access for discovery purposes. Internal procedures are so well developed that the government is well on the way from the outset toward rebutting Nat's claim that the employees failed to exercise ordinary care. Whatever strength Nat's case may have in sympathies for "the injured citizen against the cold, insensitive government" is lost because the trial of such cases is without a jury.

Even supposing that Nat has successfully overcome the obstacles in establishing negligence, his claim may still fail under the statute if the negligence is deemed to have been the exercise of a *discretionary* function of the employee that committed that act of

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[7]Art. VII, Liability Convention.

[8]28 U.S.C.A. § 1346(b), the Federal Tort Claims Act.

[9]See, *Dalehite v. United States,* 346 U.S. 15 (1953); *Laird v. Nelms,* 406 U.S. 797 (1972). This fault requirement is applicable to the administrative remedy that Nat must pursue prior to actual litigation. Section 2675, requires that he submit his claim to the appropriate agency for determination, and that such a claim be denied by that agency before suit can be brought. Section 2672 places a $25,000 ceiling upon awards to be made under this procedure, without prior approval of the attorney general.

negligence.[10] The closer the act that Nat claims to have been the operative negligent act causing his injury comes to being a policy decision, as opposed to a decision involving the operation of the activity pursuant to that policy, the greater the possibility that it will be considered by the court to be a discretionary function, barring Nat's recovery.[11]

Analysis of the decisions dealing with this exclusion from liability teaches that, while generalizations such as that just stated may assist in predicting the outcome of Nat's claim on the basis of what conduct he asserts to be negligent conduct, precision is far from at hand when it comes down to the actual determination of whether the act is nonactionable under the discretionary exclusion. For example, if Nat were to claim that the failure to warn him prior to the accident was the *sine qua non* of his injury, the application of the exclusion may well turn upon the persuasiveness of the argument concerning the existence of an obligation to warn. The facts of the particular case under review may be sufficiently persuasive to impose a "duty to communicate. . . adequate warning of existing foreseeable hazard," the failure of which to exercise might constitute actionable "operational mismanagement."[12] On the other hand, the failure to warn may be determined to be a "discretionary decision. . . that such notice was impractical or would interfere with the carrying out of the project or would involve wasted time without justification."[13]

Nat's claim will be fraught with the same difficulties if he tries to establish faulty conduct involving the very decision to engage in the project. The sonic boom cases provide illustrations of court decisions that have gone both ways on the question of whether such projects involved discretionary decisions.[14]

Nat has other options under federal law, however, in seeking redress for his injuries in order to avoid the difficulties presented by the Federal Tort Claims Act and its limiting provisions. Where the injuries have arisen from the ". . . conduct of the [National Aeronautics and Space] Administration's functions. . .",[15] Nat may submit

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[10] 28 U.S.C.A. § 2680 (a).

[11] This is a gross oversimplification of an extremely complex and troublesome aspect of the Federal Torts Claims Act, but it must suffice for the purposes of this paper. For more detailed discussion of the problems created for persons in Nat's position, *see,* 2 L. Jayson, Handling Federal Tort Claims: Administrative and Judicial Remedies (Chp. 12 1978) [hereinafter Jayson].

[12] *United States v. State of Washington,* 351 F. 2d 914, 91 (9th Cir., 1965) where decedents were killed when their plane flew into power lines across a valley not marked by warning devices. *Cited* in Jayson, *supra,* note 10, at 12-83 n. 12-1.

[13] *Bulloch v. United States,* 133 F. Supp. 885, 888, 889 (Utah, 1955), where claimants' sheep were allegedly killed by radiation from nuclear testing. *Cited* in Jayson, *supra,* note 10, at 12-84 n. 13.

[14] *See,* Jayson, *supra* note 10, at 12-120-12-124.

[15] 42 U.S.C.A. § 2473 (b) (13) (A).

his claim for personal or property injury, or death, to NASA for special administrative determination and settlement by that agency.[16]

Under this administrative claims procedure, Nat can avoid the requirement of proving that the injury was caused by the fault of federal employees. So long as he establishes that the injury arose out of the conduct of the agency's space programs, he can avail himself of the theory of strict liability. Claims procedure, evidentiary standards, scope of review, and investigatory procedures are spelled out in some detail by the agency's regulations.[17]

The administrative scheme of recovery is not without its drawbacks, however. The power of the agency to pay claims is limited to $5,000.00.[18] In the event of serious injury exceeding this amount, Nat would be forced to undergo the rigors of the requirements of the Federal Tort Claims Act. The agency may mitigate this effect if it decides Nat's claim is meritorious by submitting the claim to Congress for its consideration.[19]

The consideration of Congress just mentioned is the remaining scheme of recovery for Nat under the circumstances of injury by a U.S. space object. It becomes operable, however, only after Nat has exhausted his other available judicial and administrative remedies. By private bill, the Congress has unlimited power to provide redress for Nat's injuries. For example, it may simply provide for payment of a definite sum, it may remove monetary limits from the agency's power to determine and settle Nat's claim, or shape relief in some other form.[20]

Liability of the Private U.S. Corporation:

The situation involving injury by a space object owned by a private U.S. corporation presents further complexities to Nat's attempt to obtain redress. The Liability Convention does not address itself to the accountability of such entities to persons injured by fallen space objects. This is a serious omission in light of the fact that the Outer Space Treaty places responsibility upon parties to that treaty for space activities whether the acting entity is governmental or nongovernmental,[21] and in light

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[16]This administrative procedure is independent of the claims procedure required by the Tort Claims Act, § 28 U.S.C.A. 2675. The claimant may select from the two statutes as alternatives. Failure to designate the statute under which the claimant is submitting a claim allows the agency to treat the matter under either. *See,* Jayson, *supra,* note 10, at 1-90.

[17]14 C.F.R. §§ 1204.900-.915, covering claims accruing on or after Jan. 18, 1967.

[18]42 U.S.C.A. § 2473 (b) (13) (A).

[19]42 U.S.C.A. § 2473 (b) (13) (B).

[20] *See,* Jayson, *supra,* note 10, at 1-164.

[21]Art. VI, Outer Space Treaty.

of the avowed purpose of the Liability Convention to "elaborate effective international rules" on the matter. Arguably, Nat could impose the responsibility of the Outer Space Treaty through the medium of the Liability Convention upon a launching state if the launching state was a party to both documents (and if the launching state was some state other than the U.S.). But what if the launching state was not party to one or both of the agreements?[22] Furthermore, even where the launching state is party to both, the problem of the language ". . . *its* space object" in Article II of the Liability Conventions crops up again.

If Nat decided to proceed against the corporation instead of the launching states on a theory of negligence, he faces the very difficult task of establishing a *prima facie* case. As mentioned in previous discussion, penetrating the extremely complex technical features of the defendant's space activities to identify the culpable conduct with specificity would be difficult, time-consuming, and require the services of people qualified to make the investigation, all of which would make the preparatory work quite expensive. A much better theory to proceed upon would be strict liability.

There seems to be considerable agreement that space activities are of the type of high-risk activities upon which a foundation for the imposition of strict liability can be grounded,[23] but the matter cannot be treated as a foregone conclusion at litigation where the matter would be one of first impression. Again, constraints require brevity and over-simplification, but in addition to having to prove damage and causation as in all the other schemes for recovery, Nat would carry the burden of persuading the court and jury that the activity is one in which the imposition of strict liability is justified. The American synthesis of this principle, enunciated in the leading case of *Rylands v. Fletcher* [24] over one hundred years ago, is contained in the Restatement of Torts 2nd, Sections 519 and 520. Those sections, representing a distillation of the American case law impose strict liability where the activity is determined to be "abnormally dangerous." A court considering Nat's claim, and following the Restatement formulation, would make the determination of whether the defendant's space activities were "abnormally dangerous" by reference to several criteria:

(a) Whether the activity involves a high degree of risk of some harm to the person, land or chattels of others;

(b) Whether the gravity of the harm which may result from it is likely to be great;

(c) Whether the risk cannot be eliminated by the exercise of reasonable care;

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[22] *See,* Foster, *supra,* note 2, at 164.

[23] See Foster, *supra,* note 2, at 150-154; Staff Report, *supra,* note 2, at 26.

[24] *Fletcher v. Rylands,* L.R. 1 Exch. 265 (1866); *Rylands v. Fletcher,* L.R. 3 H.L. 330 (1868).

(d) Whether the activity is not a matter of common usage;

(e) Whether the activity is inappropriate to the place where it is carried on; and

(f) The value of the activity to the community.

In evaluating those criteria, it is apparent that each involves the application of value judgments regarding the defendant's activities. In reaching the ultimate conclusion the weight to be given each of the criteria will vary according to the strength of the value judgment accorded to each. From Nat's point of view, criteria (d) through (f) are troublesome. It is not at all apparent that a finder of fact would not attach overriding weight to the importance of space activities and require that Nat bear the risk of injury.

Even assuming that Nat would be successful in imposing a strict liability standard against the corporation, he still faces some extreme difficulty in establishing cause. The imposition of strict liability is nowhere considered to be simply a matter of making the defendant the insurers for plaintiffs' injuries. Because of the involvement of the launching state in actually putting the space object into orbit, the causative factors are multiplied and complicated. The more causative factors present, the greater the number of opportunities for the corporation to escape accountability.

As a final illustrative hypothetical, consider the problems that might be presented if all three of our different types of space objects were involved in the same accident. Suppose that through some negligent act, the private corporation caused the orbit of its space object to rapidly decay. Suppose further that the U.S., after obtaining operational status with the Space Shuttle program, attempted to "rescue" the private space object by bringing it back to earth. As the Space Shuttle began its descent, it encountered the space object of Norka. Recognizing that his reentry attitude would be jeopardized if he made adjustments to avoid the Norka space object, the commander of the Space Shuttle decided to take his chances of missing the Norka craft, since Space Shuttle is many times the size of the former. A collision occurred, the force of which was not anticipated by the commander. The impact causes: (a) the Norka space object to fall from orbit; (b) the corporation's space object to be jarred loose from the space Shuttle and fall from orbit, and; (c) the Space Shuttle to fall uncontrollably to the surface of the earth. All three objects' crashes produce "damage" to Nat the sense contemplated by the Liability Convention.

With all of the substantive bases for recovery available, and three separate respondents available, it would seem that Nat stands a very good chance for full recovery. A closer look reveals otherwise.

First of all, Nat's claim against Norka will be vigorously defended on the basis that its space object did not "cause" Nat's damage. Norka's representatives will argue that "caused by its space object" calls for application of the *sine qua non test:* but for the

acts of the Space Shuttle commander and the corporation's employees, Norka's space object would have remained in orbit. They may also argue that Article VI operates to exonerate them on the grounds that the Space Shuttle commander's decision amounted to gross negligence, since it constituted a reckless disregard for the property and passage rights of Norka.

As to the claim against NASA, Nat will have to prove fault as to any damages in excess of $5,000.00. Even if he is successful in that regard, it is still open to question whether the decision of the Space Shuttle commander was sufficiently discretionary to exonerate NASA from liability under the Federal Tort Claims Act.

IF Nat proceeds against the U.S. corporation, he faces the difficulties of proving negligence, or convincing the court to apply a strict liability standard. Even if successful in either respect, the corporation will, of course, argue vigorously, and with merit, that the acts of the Space Shuttle commander constituted an intervening causative factor which should absolve the corporation from liability.

So, it appears that considerable doubt remains as to the efficacy of each of the regimes discussed in protecting persons injured as a result of fallen space objects. In light of the very real possibility of future accidents brought to light in the wake of the recent Cosmos incident, attention must be given internationally and domestically to insure that it will not be the innocent injured person that bears the risk of such injuries.

THE LEGAL STATUS OF GEOSTATIONARY ORBIT: SOME REMARKS

*Andrzej Gorbiel**

A. Introductory Remarks

Incessant progress of the space science and technology produces new possibilities for the use of outer space and as a result the need for new legal regulations has arisen. A significiant example of this is the problem of the use of the so-called geostationary orbit.

The geostationary orbit is a circular orbit located at a distance of about 35,800 kilometers over the earth's equator. A satellite placed in this orbit turns about the polar axis of the earth in the same direction and with the same period as that of the earth's rotation. The positioning of artificial satellites in the geiostationary orbit is now of great practical importance for telecommunications. But, it is expected that this orbit will be used in the near future for several other applications.[1]

The question of utilization of the geostationary orbit is complicated by the fact that due to technical considerations, the number of artificial satellites, which may be placed in it without causing mutual interferences, is limited.

The first artificial satellite, Syncom 2, was placed in geostationary orbit by NASA on the 26th of July 1963. By July 1977 the total number of geosynchronous satellites reached about one hundred. In the opinion of several experts in space technology, no more than 180 space objects can be placed in geostationary orbit.[2]

The important task of developing an adequate system for the utilization by different States of the geostationary orbit was undertaken by the International Telecommunication Union. The matter was also discussed in detail at the World Administrative Radio Conferences at Geneva in 1971 and 1977. The Final Act of the latter, signed on 13 February 1977 by the representatives of 106 countries, contains a plan assigning positions in the geostationary orbit for broadcasting satellites and

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[1]See L. Perek, Physics, Uses and Regulation of the Geostationary Orbit, or, *Ex Facto Sequitur Lex.* Doc. IAF-SL-77-44, p. 20-22.

[2]Some other experts consider this maximum number to be greater.

frequency channels in the 11.7-12.2. GHz band to States in the ITU Region 1 (Europe and Africa) and 3 (Asia).[3]

The juridical aspects of the utilization of the geostationary orbit has been previously treated in space law literature.[4] But with the advent of claims to exclusive sovereignty by equatorial countries over segments of this orbit, it has become the focus of heated discussion.

B. Claims of the Equatorial Countries

It was Colombia which during the thirtieth session of the United Nations General Assembly in October 1975 first laid claim to a segment of the geostationary orbit lying over its national territory. The representative of Colombia argued that this segment is a part of the territory of his country and that "it is not included in the conception of outer space alluded to in the Treaty on Principles Governing The Activities of States in The Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, signed in January 1967".[5]

This stand of Colombia was again expressed during the next session of UN General Assembly in 1976. At the same thirty-first session an analogous position was taken by Ecuador[6] and Panama.[7]

On November 29, 1976 a special conference of eight equatorial countries convened in Bogota, Columbia. This conference ended on December 3, 1976 with the signing of a common Declaration setting forth in a systematic and detailed manner these nations' position on the legal status of the geostationary orbit.[8]

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[3]This Act will enter into force on January 1, 1979. For the ITU Region 2 (Americas) an interim plan was adopted for the period pending the adoption of a more detailed plan by a Regional Administrative Radio Conference to be held no later than 1982.

[4]See J. Busak, Geostationary Satellites and the Law, Telecommunication Journal (No. VIII, 1972); M. G. Marcoff, Traite de droit international public de l'espace, 64, 232, 618, n. (Fribourg, 1973); B.G. Dudakov, Pravovye problemy ispolzovanya orbit dla iskustvennych sputnikow Zemli, "Sovietskoje Gosudarstvo i Pravo" 78 (No. 4, 1973), n.; G. C. Merckel, The Direct Broadcast Satellite: The Need For Effective International Regulation, 2 Syracuse J. Int'l L. and Commerce 111 (1974).

[5]UN Doc. A/C.1/PV.2052, pp. 45-46.

[6]UN Doc. A/C.1/31/PV.10, pp. 37-38.

[7]UN Doc. A/C.1/31/PV.10, pp. 81-82.

[8]The representative of Brazil signed the Declaration as an observer. For a text of the Declaration, see EL ESPECTADOR (Columbia), December 7, 1976, p. 13A. For the English translation see ITU, Broadcasting Satellite Conference, Doc. No. 81-E (January 17, 1977). 6 J. Space L. 193.

As a starting point the signatories state that "the geostationary synchronous orbit is a physical fact linked to the reality of our planet because its existence depends exclusively on its relation to gravitational phenomena generated by the earth and that is why it must not be considered part of the outer space". This basic statement leads them to the principal point of the Declaration - a proclamation of their national sovereignty over the respective segments of the geostationary orbit as being their "natural resource". Positioning of devices in these segments shall require - according to the Declaration - "previous and expressed authorization on the part of the concerned State".[9]

The next paragraphs of the vast document try to explain the motivation for this advanced claim.

C. Arguments of the Equatorial Countries

The first argument deals with the assertion that the rights of equatorial countries to treat segments of the geostationary orbit as being under their national sovereignty is founded on the fact that these segments, linked with their terrestrial territories by earth's gravitation, constitute one of the natural resources which the Resolutions of the United Nations General Assembly has recognized as belonging to States and especially to the developing countries as part of their "full and permanent sovereignty".[10]

The second argument is formulated by way of deduction from the Space Treaty of 1967. The geostationary orbit may be considered as being not a part of outer space in the meaning of this Treaty because this Treaty had not established a definition of outer space. From this lack of such a definition, the signatories of the Bogota Declaration draw a conclusion that Article II of the Treaty, forbidding any national appropriation of outer space, does not apply to the geostationary orbit.

It is characteristic and somewhat confusing that the Bogota Declaration of December 3, 1976 uses the Space Treaty of 1967 for drawing the above mentioned argumentation and contests its value by saying that it "cannot be considered as a final answer to the problem of the exploration and use of outer space". This is particularly so since its text was "elaborated when the developing countries could not count on adequate scientific advice and were thus not able to observe and evaluate the omissions,

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[9]As to the segments of the geostationary orbit over the open sea the equatorial countries declared that they consider these segments as the "common heritage of mankind" since they are beyond the national jurisdiction of states. *Ibid.*

[10]On this point, the signatories of the Declaration quote the UN General Assembly Resolution 2692/XXV on. "Permanent sovereignty over the natural resources of developing countries and expansion of domestic sources of accumulation for economic development" and the UN General Assembly Resolution 3281/XXIX on "The Charter on Economic Rights and Duties of States". *Ibid.*

contradictions and consequences of the proposals which were prepared with great ability by the industrialized powers for their own benefit''.

D. Discussion in the UN Outer Space Legal Subcommittee

The equatorial countries reitereated their claims to parts of the geostationary orbit at the ITU World Radio Conference held at Geneva in January-February 1977. Several States participating in this Conference made formal declarations that ''the assignment of positions in the geostationary orbit for broadcasting satellites are fully in conformity with the generally recognized principles and rules of international law''.[11]

In the United Nations Outer Space Legal Subcommittee the question was debated for the first time during its Sixteenth Session held in New York from March 14, to April 8, 1977. It was debated in connection with two agenda items: ''Elaboration of principles governing the use by States of artificial earth satellites for direct television broadcasting'' and ''Matters relating to the definition and/or delimitation of outer space and outer space activities''.

Three equatorial countries; Colombia, Ecuador and Guyana which at the time were not members of the UN Committee on the Peaceful Uses of Outer Space and of its Scientific and Technical, and Legal Subcommittees obtained at their request the right to attend the formal meetings of the latter.[12]

The most extensive statement on behalf of the equatorial countries was that of the Colombian representative Mr. E. Gaviria who presented in detail the position of the signatory States of the 1976 Bogota Declaration. He proposed to convene a special international conference for considering ''with the proper care and seriousness the definition of outer space and the special regime called for by phenomenon of the geostationary synchronous orbit''. Maintaining that the proclamation of the national sovereignty over segments of the geostationary orbit is not contrary to the provisions of the 1967 Space Treaty, the Colombian delegate contended simultaneously that this Treaty ''did not take account of the interests of the developing countries'' and sought rather to ban the use of space for military purposes than to deal appropriately with the phenomenon of telecommunications.[13]

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[11]See ITU, Broadcasting Satellite conference Doc. 266/Rev. 1/-E.

[12]UN Doc. A/AC.105/C.2/SR. 266, p. 2.

[13]UN Doc. A/AC.105/C.2/SR.77, p. 2-4. The representative of Colombia also reproached the UN Outer Space Legal Subcommittee that it served ''the interests of the highly industrialized states, harmed those of the developing countries''. This reproach produced a firm opposition on the part of Mr. B. G. Maiorski, representative of Soviet Union, who rightly stated that the Subcommittee acted in accordance with the principle of consensus and ensured that the views of all countries, both developed and developing, received an equal hearing and equal respect. *Id.* at 5.

Ambassador M. A. Albornoz from Ecuador stated that a rejection of the claims of equatorial countries would lead to "a neocolonialism of outer space". He compared these claims to national sovereignty over segments of the geostationary orbit with those concerning the admitted jurisdiction of the coastal States over the maritime economic zone.[14]

The juridical analogy with the legal status of the maritime economic zone was also invoked by the Indonesian delegate Mrs. I. M. Damanik who proposed to conclude a treaty stipulating "the granting of priority to equatorial states in the use of the geostationary orbit".[15]

The representative of Kenya Mr. J. Simani emphasized the urgent need of the formulation of a definition of outer space taking "into account the special position of equatorial countries with respect to the geostationary orbit forming part of their natural resources".[16]

The position of equatorial countries produced criticism by a number of delegations of member States of the United Nations Outer Space Legal Subcommittee. But their statements in this matter had a general and preliminary character without detailed analysis of the various juridical aspects and implications of the problem. The delegate of the Soviet Union, Mr. B. G. Maiorski, said the geostationary orbit is inseperable from outer space and the location of States did not creat any right of ownership to it or to any segment of it.[17]

The author of this paper, acting as the representative of Poland, stated that the geostationary orbit forms an integral part of outer space and "unquestionably comes under the provisions of Article II of the Treaty of January 27, 1967" and that it "could not be subject to the exclusive sovereignty of States".[18]

More extensive pronouncements were made by the delegates of the United Kingdom and United States.

Mr. A. M. Greenwood, head of the British delegation, rightly pointed out that the claims of equatorial countries were vague as to the question of whether or not these countries claim part of the geostationary orbit as a slice taken out of the rest of outer

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[14]UN Doc. A/AC.105/C.2/SR.272, p. 3.

[15] *Id.* SR.272 at 6.

[16] *Id.* SR.280 at 2.

[17] *Id.* SR.282, at 3. A more detailed presentation of the Soviet position in this matter is contained in UN Doc. A/AC.105,L.94.

[18]UN Doc. A/AC.105/C.2/SR.277, p. 2.

space or whether their claims included the whole of the space segment between the underlying country and the geostationary orbit.[19]

Mr. D. P. Stewart, United States delegate, criticized with insight the assertion that the legal admissibility of the national appropriation of the geostationary orbit is based on its dependence on earth's gravitation.[20]

It is expected that the seventeenth session of the UN Outer Space Legal Subcommittee to be held at Geneva in 1978 will have a more detailed and complete discussion of the matter.

E. Claims of National Sovereignty over the Geostationary Orbit and International Law

An adequate juridical evaluation of the international legal status of the geostationary orbit begins with an adequate statement of its real essence.

The signatories of the 1976 Bogota Declaration classify the geostationary orbit as "a physical fact" depending exclusively on the earth's gravity. This approach is an improper one. In reality the geostationary orbit is nothing more than one of the possible trajectories of the artificial earth satellites.

The space technology experts agree that the position of an artificial satellite in geostationary orbit is dependent on several factors such as: the launch and station-keeping propulsion, the attraction of the earth, the moon and the sun, and the solar radiation pressure.[21] Therefore the force of the earth's attraction is merely one of the elements determining the maintenance of an artificial satellite in the geostationary orbit, but it is not the only one.

It is quite nonsensical to maintain that the alleged rights of a sovereign over segments of the geostationary orbit derive from the action of the gravitational force of the terrestrial territories belonging to equatorial countries. The force of the earth's gravity derives from the mass of the whole of our planet and the sub- division demanded by the equatorial countries is unfeasible and preposterous.

The rejection of this argument of the signatory States of the 1976 Bogota Declaration also overturns the thesis that parts of the geostationary orbit constitute their "natural resources".

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[19] *Id.* SR.269, at 8.

[20] Press Release USUN-18/77 (April 7, 1977).

[21] A highly precise description of these factors determining the position of the geostationary satellites in orbit was given recently Professor Lubos Perek, Chief of the United Nations Outer Space Affairs Division, in his above cited paper.

The remaining principal plea in the position of the equatorial countries is seeking a juridical base for the admissibility of national appropriation of segments of the geostationary orbit in the absence of an outer space definition or delimitation in the text of the 1967 Outer Space Treaty. This plea is juridically pointless, too.

The fact that the 1967 Treaty failed to define the scope of the term 'outer space' is not tantamount to the impossibility of determining this scope in a general manner by way of deducing it from the Treaty's provisions, as a whole.

The main intent of the Treaty was to institute a set of international legal principles governing the activities of States in the exploration and use of outer space. This use encompasses objects launched into outer space and in particular artificial earth satellites placed in orbit around the earth. Therefore, implementation of the 1967 Treaty is possible on the assumption that its provisions concern those regions of space in which the artificial earth satellites are placed. The acceptance of an opposite assumption deprives the 1967 Treaty, and other international conventions based on it, of a reason for their existence.

An admission that Sates have a right to decide at choice which parts of space above the earth they will treat as outer space under the rule of the 1967 Treaty will be tantamount to a recognition of total arbitrariness inconsistent with the essence of international legal order.

One should conclude that the legal status of the geostationary orbit cannot be different from that of the whole outer space and in consequence any national appropriation of it is inadmissible.

AN INTEGRATED LEGAL SYSTEM FOR SPACE +

by
Hamilton DeSaussure *

Currently there are 560 space shuttle operations planned through 1992.[1] If each of these operations were to carry a six-man crew, 3,300 astronauts would be launched into space before the end of this century. While the space shuttle is the only means of space transportation now being geared up for operational use, plans are being considered for other methods of low cost access to the vast regions beyond the earth's atmosphere. As cheaper transportation provides greater access to space, entry into space by commercial firms is certain to expand.[2] Some experts predict space industry revenues will reach $20 billion annually by the year 2000.[3] Products and processes already being considered are: satellites (for communication, remote sensing and solar power), crystal growth, pharmaceuticals, alloying of metals and ball bearings, electronic components, and ultrapure exotic materials that can be produced in zero gravity.[4] A recent survey shows that a sizeable selection of U.S. companies are already contemplating spaceborne activity. Boeing has conducted a study for NASA that involves converting the sun's rays to electrical power and beaming them to earth. The plan would require scores of shuttle flights to build a construction base in space and would require a five hundred man construction crew for about a year to build a solar power satellite.[5] In a more conjectural vein, Professor O'Neill of Princeton proposes a beachhead manufacturing plant in space with a large factory of workers living within a one-mile circumference of the plant.[6] It is

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+ This paper is based on a presentation by the author at the 1977 Annual Meeting of the American Astronautical Society in San Francisco.

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[1]Hearings on H.R. 2221 Before the House Subcommittee on Space Science and Applications of the Committee on Science and Technology, 94th Cong., 2d Sess., (1976) [1 1978 NASA Authorization, 394 (1976)] (hereinafter cited as 1978 NASA Authorization).

[2]1966 proposal for a "skyhook"; a cable from a satellite in geostationary orbit to earth. Payloads would be sent up the cable mechanically: Hearings Before the House Subcommittee on Space Science and Applications of the Committee on Science and Technology, 94th Cong., 1st Sess. (1975) (*Future Space Program 1975*, 198 (1975).

[3] *"The Shuttle Opens the Space Frontier to U.S. Industry," Bus. Week,* August 22, 1977, at 49.

[4]The most important system being considered by NASA is the Space Construction Base, *see* 1978 Authorization at 399. This space station would serve for a ten year study of space industrialization and satellite power generation. *Id.* Also being studied are: large structures in orbit via the shuttle and development of Heavy Lift Launch Vehicles. *Id.* at 400, 415.

[5] *Akron Beacon J.*, February 1, 1978, at 2.

[6]. *New Scientist,* June 23, 1977, at 720.

entirely possible that the number of persons, including scientists, engineers, and other members of the labor force, who cross the threshold into space before the end of this century may exceed present estimates by the tens of thousands.[7]

As we penetrate the space frontier in large numbers, the legal problems which confront us on earth will also ascend into the space environment. Human activity cannot long endure in a legal vacuum. Affairs in space will have to be subject to the same complex legal regime which exists on earth. An established order brings stability to human conduct and provides the predictability so needed to promote human progress and maintain harmonious relationships.

The foundation for such a legal regime has already been set forth in such documents as, the Outer Space Treaty of 1967,[8] the Treaty on the Rescue and Return of Astronauts and Return of Space Objects of 1968,[9] the Convention on Liability for Damage Caused by Space Objects of 1972[10] and the Convention on Registration of Space Objects of 1975[11]. Some of the fundamental principles provided therein are that in outer space: international law applies;[12] there can be no national appropriation by claim of sovereignty or by use or by occupation;[13] and states bear international responsibility for their national activities.[14] Also provided is that the activities of nongovernmental entities require the authorization and continuing supervision of the appropriate state, and that jurisdiction and control over space launched objects and the

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[7]Prof. Gerard K. O'Neill believes a beachhead manufacturing plant in space could be built well before the turn of the century which could build one new colony every two years. He estimates that this could lead to as many as 200,000 people living in space by the year 2000. Lutz-Nagey, *"Gerry O'Neill and His Solar-Powered Space Factory", Automation,* July, 1976, at 22.

[8]The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (hereinafter referred to as the Outer Space Treaty) was signed on January 27, 1967 and entered into force October 10, 1967 [1967] 18 U.S.T. 2411, T.I.A.S. 6347, 610 U.N.T.S. 205.

[9]Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, April 22, 1968, [1968] 19 U.S.T. 7570, T.I.A.S. 6599, 67 U.N.T.S. 119 (hereinafter cited as Rescue and Return Agreement or Rescue Agreement).

[10]Convention on International Liability for Damage Caused by Space Objects, March 29, 1972 [1973] 24 U.S.T. 2389, T.I.A.S. 7762 (hereinafter cited as Liability Convention).

[11]Convention on Registration of Objects Launched into Outer Space, January 14, 1975_____U.S.T._____, T.I.A.S. 8480. See also Hearing before the Subcommittee on Space Science and Applications of the House Committee on Science and Technology, 94th Cong., 2d Sess. (1976).

[12]Outer Space Treaty, Art. III.

[13]*Id.* Art. II.

[14]*Id.* Art. VI.

personnel therof, while in outer space, remains with the launching state.[15] These principles are a foundation, but only a foundation, for the web of intricate rules which must accompany any sustained and concentrated use and exploration of the realms beyond this earth.

Broadly speaking, there are two views as to how law may emerge for outer space. One view is that this new arena for human endeavor is so vast, so potentially hostile, and so unique that a completely new, perhaps even revolutionary, legal system is necessary. As early as 1961, this view was raised. At that time Ambassador Jha of India was asked whether merely overlaying international law on outer space would suffice. He wrote:

> When the day comes that men of various nations, through international cooperative efforts, journey into outer space, the concepts of nationality, territorial affiliations, (and other concepts) should perhaps be forgotten and will be out of place in outer space. International law may need radical adaptation, conceptual or otherwise, for application to outer space.[16]

The other view is that existing terrestrial laws should be adapted to the space environment without any radical break. A soviet author, Academician E.G. Vassilevskaya, has stated that the expansion of space activities from pure science to the applied use of outer space makes it necessary to develop further "the law-making activity in the exploration and use of outer space."[17] Whichever view one takes, however, it is not likely that a suddenly new and detailed set of laws for spaceborne activity can be compiled without a greater depth of experience. Existing executive, legislative and judicial processes are earthbound. For the foreseeable future, at least, the judges, administrators and legislators who must settle, regulate, or pass laws to cover spacebound controversies sit on this earth and are trained under the great legal systems, principally the common and civil law systems, which exist here. Terrestrial law as applied and administered to earthly activities will have to be adapted for outer space. The question then is which terrestrial law. There are fifty-two legal systems in the U.S. alone and well over 200 throughout the world, each having potential application to outer space. The various legal systems of the world are not uniform in their legislative and judicial approach to international activity. Completely diverse decisions can turn on the system of justice brought to bear on the dispute or controversy which arises in space. Ideally there should be substantial integration of all the civilized legal systems in their applications to outer space. There is precedent. The treaties creating the European

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[15] *Id.*

[16] S. Lay and H. Taubenfield, *The Law Relating to Activities of Man in Space* 66, note 15 (1970) (statement of Ambassador Jha). *See also,* R. Chernow, *Colonies in Space May Turn Out to Be Nice Places to Live,* 6 Smithsonian Magazine 62 (Feb. 1976).

[17] D. Vassilevskaya, *Drawing up a Draft Treaty on the Moon,* Proceedings of the Nineteenth Colloquium on the Law of Outer Space 99 (1977). Finch and A. Moore, *Ecospace: The Economics of Outer Space and the Future,* 62 A.B.A. J. 338 (March, 1976).

Communites provided for substantial harmonization of the national laws of the signatory countries.[18] Scandanavian countries have also succeeded in unifying large segments of their laws.[19] It is also possible that the practice of spacefaring nations will produce a common law analagous to the maritime law developed by seafaring states, although such a development is not likely in this rapidly unfolding space age.

Undergirding the extension of any national or international laws into outer space are the paramount issues of state, federal and international jurisdiction. Jurisdiction has a dual meaning. It means the capacity to prescribe a rule of law and it also means the capacity to enforce that rule.[20]

The Outer Space Treaty deals primarily with prescriptive rather than enforcement jurisdiction. By providing that the registry State retains jurisdiction and control over its objects and personnel *while in outer space or on a celestial body,* amenability to legal process on return to earth is not within the bounds of the treaty. The treaty also provides that nongovernmental entities in outer space shall be authorized and supervised by the appropriate State. The operative words are "while in outer space" and "in outer space."[21] Once personnel and objects return to earth, they come within the territorial and national jurisdiction of local law enforcement agencies. While torts may occur, crimes may be committed, and contracts breached in outer space, the pursuit of legal remedies, civil or criminal, is earthbound. Two of the great legal systems of the world, the common and civil law systems, approach the exercise of terrestrial jurisdiction from different viewpoints. In the case of tort or crime, the common lawyer will be first interested in where the incident giving rise to the complaint occurred, and also whether the tortfeasor or perpetrator is within the court's reach. The civilian lawyer will have more interest in the nationality of the parties and objects involved, the victim, and actor, and the craft. The principle and often the exclusive basis for the exercise of prescriptive or enforcement jurisdiction in a common law country is territorial. The United States is a good example of a sovereign which closely adheres to the common law. In the matter of prescriptive jurisdiction, the Supreme Court has written that "the legislation of Congress, unless a contrary intent appears, is meant to apply only within the territorial jurisdiction of the United States."[22] When it comes to enforcement (or adjudicatory) jurisdiction, common law systems generally require that physical presence,

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[18]E. Stein, *Assimilation of National Laws as a Function of European Integration,* 58 A.J. Int'l. L. 1 (1964).

[19]N. Pontoppidan, *A Mature Experiment: The Scandinavian Experience,* 9. Am.J. Comp. L. 344 (1960).

[20]Restatement (second) of Foreign Relations §§ 17, 20 (1965). For a proposal to promote a functional jurisdiction in outer space, *see* I. Csabafi, *The Concept of State Jurisdiction in International Space* Law 126-151 (1971).

[21]Outer Space Treaty, Arts. VI, VIII.

[22] *Foley Bros. v. Filardo,* 336 U.S. 281, 285 (1948).

voluntary consent, or certain minimum contacts with the forum are essential for the court to take *in personam* jurisdiction. In civil law systems, nationality is the prime basis for the exercise of either prescriptive or enforcement jurisdiction. In France, for example, a civil court may exercise its powers over any alien, wherever he may be, who breaches his duty to a French national.[23] Neither the tortious conduct nor the alien defendant himself need be located in that country.

With the placing of the European Space Agency's (ESA) Spacelab in orbit by the launch of a U.S. space shuttle in 1980, a shirtsleeve environment for the conduct of scientific and technical experiments will be provided for astronauts of different nationalities. Assume six space scientists, three American and three French are actively engaged in research on board and that they remain in orbit for thirty days. An American scientist is negligent. He mishandles an experiment and a French colleague is seriously injured. Upon their return to earth the Frenchman may sue the American in a French court although the American has never been in France and has no relationship with the country other than that the tort is committed upon the Frenchman. Neither the Outer Space Treaty nor the Liability Convention deny the right of spaceborne personnel to seek a remedy within their own legal system. Suppose, however, it is the Frenchman who is negligent and the American scientist who is injured. The American wishes to sue in a U.S. court. Our courts may refuse to exercise their adjudicatory jurisdiction over the French scientist unless he is personally summoned within the political boundaries of the court, or consents to the suit, or otherwise can be found to have some minimum relationship with the forum state. The American may be compelled to sue in a French court and under an unfamiliar law. It is true the same disparity of jurisdiction exists on earth. The factors that intensify this situation in outer space, however, are the close living quarters and sustained and frequent contacts which human activity in space will engender. West German law provides an even more exorbitant basis for the exercise of adjudicatory jurisdiction than does France. The German code of civil procedure provides that a claim for money damages may be asserted in the court of any district wherein the defendant has property.[24] This is not like a common law in rem proceeding where the property itself may be the subject of the dispute. Once the defendant's property is found within its political boundary, the German court has personam jurisdiction up to the amount of provable damages which may far exceed the value of the property. To take an extreme case, a book or a scientific paper forwarded to a German colleague may vest the appropriate German court with power to decide a spaceborne tort committed by the alien property owner.

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[23]Art. XIV Civil Code cited from H. deVries, N. Galston and R. Loening, Materials for the French Legal System 2 (1977).

[24]deVries and Lowenfeld, *Jurisdiction in Personal Actions-A Comparison of Civil Law Views,* 44 Iowa L. Rev. 306, 334 (1959).

Assume now the conduct of our luckless American scientist in the ESA spacecraft is so reckless that it amounts to criminal conduct. Will a U.S. criminal court have competence to prosecute? In common law systems, criminal offenses must be defined by statute and they are not applied extraterritorially, absent clear legislative intent.[25] The application of this rule was clearly expressed in a case involving an assault by a Puerto Rican passenger upon the pilot of a U.S. commercial aircraft in flight over the high seas. At the time, the admiralty and maritime jurisdiction of the United States extended to crimes committed "upon the high seas or on any other waters within the admiralty and maritime jurisdiction of the United States and out of the jurisdiction of any particular state."[26] In arresting judgment against the Puerto Rican passenger, the federal district court held that a statute regulating crime *upon* the high seas did not provide a federal court jurisdiction to consider an offense committed *over* the high seas. Shortly after this decision Congress extended the special maritime and territorial jurisdiction of the United States to include aircraft in flight over the high seas.[27] More recent cases have determined that the "special maritime and territorial jurisdiction" of the United States extends to homicides committed on an iceflow in the Arctic Ocean,[28] and on the grounds of the U.S. Embassy in equatorial Guinea.[29]. U.S. legislation now provides for a special aircraft jurisdiction of the United States.[30] This jurisdiction extends to civil and military aircraft of the United States while in flight and any other aircraft within the United States or outside the United States when its next scheduled destination or last point of departure is in the United States. Anyone who commits assault upon a flight crew member on board an aircraft within this special aircraft jurisdiction is subject to punishment by a U.S. federal court. This special aircraft jurisdiction extends to most federal crimes when committed in the airspace on board civil and military aircraft of the United States while in flight, and any other aircraft within the United States or outside the United States when its next scheduled destination or last point of departure is the United States.[31] The Chief Counsel of the Federal Aviation Administration advised the General Counsel of NASA in March 1977 that the Space Shuttle was not an aircraft.[32] It is doubtful that a court would construe the special aircraft jurisdiction of the U.S. as extending to an act onboard the shuttle even within the airspace.

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[25] *U.S. v. Bowman*, 260 U.S. 94 (1922).

[26] 18 U.S.C. §451 (1950).

[27] *U.S. v. Cordova*, 89 F. Supp. 298 (E.D.N.Y. 1950).

[28] *U.S. v. Escamilla*, 467 F2d 341 (4th Cir. 1972).

[29] *U.S. v. Erdos*, 474 F.2d 157 (4th cir. 1973).

[30] 49 U.S.C. § 1301(32) (1970).

[31] *Id.*

[32] Letter from the Chief Counsel of Federal Aviation Administration to the General Counsel of NASA (March 11, 1977).