Fly Me to the Moon, But is My Carrier Liable if I have an Accident?

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As to the future, your task is not to foresee it but to enable it.
—Antoine de Saint-Exupéry
The Wisdom of the Sands[1]

In 1990 Japanese reporter Toyohiro Akiyama became one of the first civilians in space, though he was not considered a space tourist as he was technically operating as an employee.[2] Helen Sharman, a British chemist, also spent eight days on Mir after winning a $10 million US competition. Dennis Tito is, however, considered the world's first space tourist paying an estimated $20 million for his seat on the Soyuz and stay at the International Space Station. He was followed by Mark Shuttleworth. The concept of space tourism has existed for many decades in literature. Writings such as Jules Verne's *From the Earth to the Moon* and *Around the Moon*, Robert Heirlinn's short story, "The Menace from Earth," Arthur C. Clarke's novel, *A Fall of Moondust,* Joanna Russ' novel, *Picnic on Paradise,* as well as television's *Star Trek,* all brought the idea of space tourism to a wide audience. The general interest in space tourism has been spurred on by private entrepreneurs and organisations, such as Paul Allen, Burt Rutan, Richard Branson and the Ansari X-prize foundation. The publicity surrounding the $10 million Ansari X-Prize (won by Scaled Composite's *SpaceShipOne*) has also highlighted the interest in space tourism.

There is a need for an instrument to regulate carrier's liability to passengers for injuries arising out of accidents from international space carriage. This article suggests that a measure similar to the Montreal Convention (MC) in air law would provide the most suitable means of achieving this.

The Need for a Legal Framework for Space Tourism

Cheng submits that there are three conditions that must be present for new rule-making: there must be a perceived need for new rules, there has to be a propitious political climate, and there has to be due regard of interests involved.[3] There are four main reasons why a new legal framework is necessary. Firstly, the emerging industry needs to be encouraged and protected. Secondly, the fact that this industry could provide such a boost to the exchequer of any involved state is in itself a reason to encourage and promote space tourism. Thirdly, the existing space law regime is inadequate to deal with the growth in the private commercialisation of space. Finally, it is necessary that some measure of protection be accorded to space tourists as consumers of services, so that unscrupulous and blatantly negligent space carriers cannot escape liability by

relying on exclusion clauses in the contract of carriage.[4]

Protection and Potential of the Emerging Space Tourism Industry

The space law industry should be protected and encouraged. This, of course, presupposes that the space tourism market is a commercially feasible industry. There are three main sections to the space tourism market. The first area is already in existence and consists of earth-based space tourism which encompasses visits to planetariums, space museums and launch sites.[5] Secondly, there is the orbital tourism market. This is the more costly end of the market and is presently only open to millionaire allocentrics. Then there is the suborbital tourism market. This includes parabolic flights and flights to low earth orbit. It allows tourists to experience the sensation of weightlessness and to observe the curvature of the earth. This market is already showing signs of moving beyond the pioneer phase. Demand for this activity may be seen to be related to the Liebenstein's "snob and bandwagon" effect, which explains how lower income groups follow the holiday patterns of the rich.[6] Space Adventures, a Virginia-based company, starts prices at $98,000 for suborbital flights.[7] Burt Rutan, the designer of *Voyager* and *SpaceShipOne,* has suggested that the first flights on the craft could be sold for $30,000-$50,000. This is less than the present cost of climbing Mt. Everest, which has a five-year waiting list.[8] Rutan also estimates that second generation suborbital space flights could cost between $7,000 and $12,000[9]—the same price range as a seat on Concorde.[10] Richard Branson, who plans to build five *SpaceShipOnes,* has estimated the initial cost of a ticket to be $200,000 with Virgin Galactic, with initial flights commencing in 2008.

In the business world, market research and reports from relevant agencies favour the development of the industry.[11] Reports by NASA,[12] the American Institute of Aeronautics and Astronautics,[13] the Japanese Rocket Society, and Daimler-Chrysler Aerospace Gmbh[14] have all come to the same conclusion: that space tourism is a viable commercial activity.[15] The most comprehensive survey carried out to date, the Futron/Zigby poll, supports this finding. Futron Corporation projects that by 2021 the space tourism industry could expect revenues of $700 million for suborbital flights (at an assumed cost of $100,000 per flight) and $300 million for orbital flights (with an assumed cost of $5 million per two week stay), with the entire industry worth over $1 billion.[16] Collins estimates that orbital, suborbital and lunar tourism with related spin-offs could bring in $120 billion per annum in revenue by 2030, with cumulative investments of $400 billion over three decades.[17] Furthermore, the feasibility of the industry has been endorsed at an international business level. One of the finalists of the 2004 Wharton Business Plan Competition was ILAT's plan for space tourism.

The Need for New Industry and the New International Economic Order (NIEO)

Collins contends that the creation by rich countries of new industries is essential to ensure that a continuation of their economic growth.[18] He argues that measures taken

by the developed countries to protect older, unprofitable industries at the expense of encouraging new industry with a greater employment potential delays economic re-structuring. He cites the example of Japan in the 1990s where the government did just this, thus causing an economic recession. Global economic development follows a particular pattern whereby less developed countries incorporate the failing industries of the developed countries into their own economies. Technological advances and better business practice reduce the number of employees required for the maximum output to match demand. These displaced employees are then re-employed in new industries. These new industries are subject to the "leading sector" effect whereby investors, anticipating future profits, push up the cost of shares, which in turn attracts new investors, allowing the new industry to grow quickly.

Collins deduces that if the average standard of living is to rise, there is a need for new industries in the leisure services sector. This is because G7 countries have a low Engel coefficient[19] and so large-scale industry directed at the middle-classes must focus on services as most necessary goods are already possessed. Space tourism is one of several industries that could fulfill these criteria. Collins also argues that it is one way of gaining a good return on the existing taxpayer's money that has been used to fund supranational space programmes.[20]

Collins' views accord well with the resolution[21] adopted by the UN at the seventh special session on the 16 September 1975.[22] This resolution states that concerted action should be taken "to accelerate the growth and diversification of the export trade of developing countries in manufactures and semi-manufactures and in processed and semi-processed products."[23] Developed countries are obliged to:

> facilitate the development of new policies and strengthen existing policies, including labour market policies, which would encourage the redeployment of their industries which are less competitive internationally to developing countries,[24] thus leading to structural adjustments in favour of the former and a higher degree of utilization of natural and human resources in the latter.[25]

The UN Industrial Development Organisation is to act as a forum for the negotiations regarding the redeployment of certain productive capacities existing in developed countries.[26] In order for developed countries to redeploy their industrial capacities, new industries must be created to take their place, or existing industries must be expanded; otherwise the developed country will suffer from high unemployment, or the fear of unemployment will dissuade developed countries from redeployment. This can be seen in the US, where trade barriers have decreased in uncompetitive markets (footwear) but increased in industries where there is no prospect of the re-employment of displaced workers (steel).[27] A new industry for the developed countries frees up other older industries for developing countries. Space tourism can be one of these new industries. The tourism industry itself is the world's largest export earner.[28]

The Boost to the Exchequer

Entrepreneurs are already taking the first tentative steps in the tourism industry and the law should not lag behind. World satellite revenues amounted to $97.2 billion in 2004 while the global launch industry was worth $2.8 billion.[29] Commercial space transportation and enabled industries contributed some $98 billion in US economic activity in 2004, with over $25 billion in employee earnings alone.[30] The greatest revenue derived from satellite services ($56.5 billion). Employment numbers in the US space industry were 551,350 in 2004 with over half in Direct-To-Home TV services.[31] Total employment in space industries in Europe[32] in 2004 was 30,523.5 including those employed by Arianespace, with a total consolidated turnover of 4,784.6 million.[33] The estimated turnover of Irish space activities was 5.7 million in 1998 this increased to 6.2 million in 2002 but decreased to 4.7 million for 2003. In 2004 the consolidated turnover for Ireland was 4.7 with the greatest amount spent on support and test activities (2.4 million). The amount spent on launcher development and production was 2.1 million, followed by satellite applications (0.1 million). Employment within Ireland in the space industry alone remains low, with the highest number being 71 in man/per year in 1998; in 2004 employment levels ran at 53, with 21 involved in satellite applications, 14 in launch systems, development and design, 1 in ground activities and 17 in unknown activities.[34] Infant-industry protection has been an element of economic development for centuries, with John Stuart Mill enunciating its benefits. Mill's test required that the industry be able to overcome its initial difficulties and compete effectively without the need for protection. Bastable stipulated that the "present discounted benefits be at least as high as the initial cost incurred to allow the infant to grow."[35] This is the stringent standard required to justify protection in the form of tariffs and/or subsidies for an industry. It is submitted that the commercial space tourism industry fulfils the test. However, subsidisation is not the type of protection sought here, but rather the lesser form of the legal limitation of liability. Legal protection of other aspects of commercial space industry, in the form of tax relief, already occurs, for example in the 2005 Zero Gravity Zero Tax Act, which provides for, *inter alia*, an income-tax exemption for goods produced in space.[36]

An analogy may be drawn between the present state of commercial space travel and commercial air travel in the 1930s. After Lindbergh's award-winning flight, ticket sales for commercial flights boomed.[37] The same effect can be seen in post-X-prize ticket sales for space tourism flights with several thousand people committing thousands of dollars for flights with Branson's Virgin Galactic, though the space vehicles have yet to be constructed. Throughout the history of commercial aviation,[38] law can be seen to have played a critical role in the development of the industry. The 1925 Contract Air Mail Act in the US lent support for emerging aviation, as did the 1926 Air Commerce Act, which provided regulations governing the grant of certificates of airworthiness, air traffic rules and examinations for pilots and crew.

The 1930 Watres Act was responsible for forcing emerging airlines to develop passenger transport by reducing the maximum that could be charged for air mail. At the end of the 1920s the Warsaw Convention was drafted. This gave the air transport market another boost to engage in commercial passenger travel. By limiting the amount any passenger could claim for injuries sustained, the industry was insulated against multi-million dollar actions that would have crippled it severely. Then, when the industry evolved and was making sufficient profits such that the limitation to deserving plaintiffs was becoming increasingly difficult to justify, the 1999 Montreal Convention was drafted, which altered the liability provisions allowing for unlimited liability in the case of proven fault. The potential the commercial space tourism industry can give to the exchequer of any engaging states during its growth and maturity phases does provide some justification for its protection. The industry will probably develop with or without a legal framework, but with the correct framework, it can develop more efficiently.

Existing Space Law Provisions on Liability[39]

The existing liability provisions can also be seen to be a hindrance to the developing industry by giving states a reason to avoid the granting of licences to private commercial operators. This is owing to the disagreement among states as to the approach to be taken by international space law to the commercial activities of private enterprises in space.[40] There is no definition or mention of "space tourism" in the *corpus juris spatialis*,[41] though it does not appear to be contrary to the existing law, as a "use of space is arguably permitted under Article 1 of the Outer Space Treaty 1967."[42] The space law that exists today grew out of the cold war climate,[43] where the primary concerns centred on the militarisation[44] and state appropriation of outer space.[45] The primary concerns today relate to the level of state regulation of private commercial activities and the free use of space by all. It is undesirable in this latter concern that we repeat the mistakes of the past vis-à-vis the Geostationary Orbit (GSO)[46] in the area of orbital travel and space access. Furthermore, it seems only just that those who wish to exploit this industry are recognised internationally as carrying some of the burden of liability and not merely restricted to a class from whom the state may seek indemnity against retrospectively under domestic law.[47]

The concept of state liability is well established by the 1967 Outer Space Treaty.[48] Article VI provides that "state parties to the treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present treaty."[49] It goes on to state that the "activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty."[50] Under Article VII, each state party that launches or procures the launching of an object into outer space, and each state party

from whose territory or facility an object is launched, is internationally liable for damage to another state party or to its natural or juridical persons by such object or its component parts on the Earth, in air or in outer space, including the moon and other celestial bodies. These limited provisions proved inadequate to deal with the issue of liability, and the 1972 Convention on International Liability for Damage Caused by Space Objects[51] was drafted to deal with this.[52]

Under Article II of the Liability Convention,[53] "a launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft flight." Damage is defined in Article I as the "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations." Article III provides for fault-based liability where damage occurs other than on the surface of earth. Under Article IV(1)(a), where space objects of two different launching states collide (other than on the surface of earth) and damage results to a third state or its natural or juridical persons, they are jointly and severally absolutely liable for damage done on the surface of the Earth or to aircrafts in flight. Liability for damage as a result of a collision sustained elsewhere is fault-based,[54] with the burden of compensation being apportioned according to the degree of fault of each launching state.[55] If such an apportionment is not possible, the burden is apportioned equally. Under Article V(2), indemnification of compensation can be sought by one launching state against other launching states. Under Article VI(1), exoneration from absolute liability can be granted "to the extent that a launching State 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." But it will not be granted where the damage has resulted "from activities conducted by a launching State which are not 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."[56]

Claims for compensation are to be pursued through diplomatic channels.[57] If a State does not maintain diplomatic relations with the launching State concerned, it may request another State to present its claim to that launching State or otherwise represent its interests under the Convention. It may also present its claim through the Secretary-General of the UN, provided the claimant State and the launching State are both members of the UN. If the claim cannot be resolved in these ways, Articles XIV and XX make provision for the establishment of a Claims Commission to resolve the matter. The Convention excludes any question of state liability towards its own nationals or to foreign nationals participating in the operation of the State's space object from the time of its launching, at any stage after until its descent, while they are in the immediate vicinity of a planned launch or in a recovery area as the result of an invitation by the launching State.[58] However, this is limited to damage caused

by a "space object," not to damage caused *on* a space object, such as an assault by a member of the crew, or on a lunar outpost or space hotel. Liability may attach to such international intergovernmental organisations that agree to be bound by the Convention, but there is no provision for any other non-state parties to accede to it.

Protection of the Tourist

Tourists are provided with a measure of protection under European Union law in general.[59] It is well established in law that consumers of services have certain entitlements,[60] such as an implied understanding that the supplier has the necessary skill to render the service,[61] that she or he will supply the service with due skill, care and diligence[62] and that the materials used will be sound, reasonably fit for their purpose,[63] and of merchantable quality.[64] These laws come from the paternalist perspective on consumer-protection[65] and the need to unify the law among member states.[66] It would seem discriminatory to allow some tourists to gain certain protections while others do not, solely on the basis of destination. It is arguable that the space tourist has voluntarily assumed the risk or is engaging in an ultra-hazardous activity and therefore should be compelled to carry the risk of injury and the burden of insuring against it. Similar arguments were made during initial litigation in the field of aviation tort law; eventually judges came to reject such an argument as no longer valid, as the industry continued to develop and compete directly with the railroads. The protection of tourists as consumers of a service (namely space transportation) is in clear conflict with the mandatory requirements of waiver and cross-waivers of domestic law.[67] The fact remains that an injured space tourist under existing regimes can have no recourse to tort law. There is no means of directly holding the party accountable for the injury liable. This is not likely to encourage a widening of the target market base of the space tourism industry.

It is clear that there is a need for a new legal framework governing commercial space tourism in the private sector,[68] one that limits liability for carriers but provides some measure of protection for potential plaintiffs as Roberts has observed: "if tourism is to become a vital part of the commercial space equation, limits on liability for the owners and operators of space facilities and vehicles will be a necessity."[69]

The Montreal Convention (MC)

The MC regulates the liability of commercial carriers for international carriage by air. It furnishes one example of the model that could be used in space law. The MC covers liability for accidents that took place on board the aircraft or in the course of any of the operations of embarking or disembarking.[70] It provides a direct cause of action against the carrier. An "accident" is defined as an unexpected, unusual event or happening that is external to the passenger's own internal reaction to the usual, normal and expected operation of the aircraft which causes injury.[71] The definition, however, does not necessarily require that the accident be a consequence of the operation of the aircraft,[72] though it must take place on board the aircraft or in the

course of any of the operations of embarking or disembarking. This has been broadly interpreted.[73] However, unlike its predecessor, the Warsaw Convention (WC), which imposes a financial cap on compensation in all cases where liability is attributable to the carrier, even in the case of death, the MC operates at two separate tiers, one of which imposes a financial limit and the other which does not. While the WC system provides for strict liability (that is, there is no burden on the plaintiff to show that the carrier is at fault; it is sufficient to demonstrate that an accident occurred),[74] the Montreal Convention has an additional tier so that where the carrier is at fault, there is no financial cap on recovery. The limitation in the first tier represents the trade-off between the strict liability/presumptive fault provisions, which would considerably assist plaintiffs and the interests of space carriers.[75] The absence of a cap where there is fault properly protects the interests of consumers as air passengers, from negligent carriers. It is arguable that the WC is preferable as it is more suited to an industry in its infancy in ensuring it cannot be crippled by liability. This may be correct but the MC may be seen to represent the law where consumer interests cannot be so easily be dismissed in favour of industry and it matches the developments in the law on duty of care antecedent to the WC. Significantly, as with other instruments regulating international carriage,[76] the MC prohibits the limitation of liability in Article 26. Insurance is mandatory for carriers in order to meet any claims arising under it, although in relation to space activities, national space law will require this in any case. The carrier will not be liable for compensation in excess of the limit if it proves that such damage was not due to the negligence, other wrongful act, omission of the carrier or its servants or agents, or such damage was solely due to the negligent or other wrongful act or omission of a third party. The carrier may be exonerated from liability where it can prove that the damage was caused or contributed by the negligence, other wrongful act or omission of the person claiming compensation, or the person from whom he or she derives his or her rights.

Conclusion

There is much potential for advancement in the space tourism industry. This has been evinced by market research conducted all over the world. The most significant restraints on the growth of the industry are safety, costs and liability. One possible solution to the last of these restraints is to adopt an international instrument similar to the MC, in order to govern liability for international space carriage. This would also provide some measure of protection for space tourists as consumers and encourage the development of the industry. Admittedly, it will not be able to solve all the problems attendant with space carriage—it will be limited only to international space carriage and it may not be able to overcome the problems associated with space tourist waivers. While the need for such regulations increases, it remains to be seen if there is a sufficiently propitious political climate for such an instrument to come into being.

When a thing has been done, it always looks easy. The years of effort, the mistakes and failures, the arguments with the experts who cried "Impossible!" are all forgotten. Instead, everyone asks: "Well, why did it take so long?"

—Arthur C. Clarke
Man in Space[77]

NOTES

[1]Antoine de Saint-Exupéry, "The Wisdom of the Sands," in *La Citadel*, trans. Stuart Gilbert (NY: Harcourt Brace and Co., 1948), p. 50.
[2]Anders Linksköld, "Space Tourism and its Effects on Space Commercialization" (Masters of Space Studies, ISU 1998-1999), May 1999. Accessed 12 April 2006, available from
http://www.spacefuture.com/archive/space_tourism_and_its_effects_on_space_commercialization.shtml.
[3]Bin Cheng, *Studies in International Space Law* (Oxford: Oxford Univ. Press, 1997), p. 687.
[4]Waivers are required for launch licences in the United States under the United States Code 49, Section 70112(b).
[5]Daniel O 'Neill, Ivan Bekey, John Mankins, Thomas F. Rogers, and Eric W. Stallmer, *General Public Space Travel and Tourism*, *Vol. 1*, Executive Summary (Washington DC: NASA/ ISTA, 1998) 11 March 1998, MSFC. Accessed 5 November 2004, available from
http://www.spacefuture.com/archive/general_public_space_travel_and_tourism.shtml#Passengers.
[6]Harvey Liebenstein, "Bandwagon, Snob and Veblen Effects in the Theory of Consumer Demand," *Quarterly Journal of Economics* 64, no. 2 (1950): 183-201.
[7]Price quotations are from the Space Adventures website
http://www.spaceadventures.com/media/faq.
[8]Sarah Bednarz**,** Roger Downs**,** Kristina Ellis, and Sigrid von Abele "Climbing Mount Everest: Then and Now," *National Geographic* (2004). Accessed 12 April 2006, available from
http://www.nationalgeographic.com/xpeditions/lessons/04/g68/climbeverest.html.
[9]Guy Gugliotta, "A Rocket Flight for the Common Man? Leader in Private Space Race Predicts New Era of Tourism," *The Washington Post*, 12 June 2004.
[10]David Rowell, "Concorde: An Untimely and Unnecessary Demise," (31 May 2004). Accessed 3 August 2004, available from
http://www.thetravelinsider.info/2003/0411.htm.
[11]Sven Abitzsch, *"Prospects of Space Tourism,"* 9th European Aeropsace Congress,

Berlin (15 May 1996). Accessed 12 April 2006, available from http://www.spacefuture.com/archive/prospects_of_space_tourism.shtml.

[12]O'Neill et al., *General Public*, 4.

[13]Mireill Gerard and P. Jefferson, eds., *International Cooperation in Space: New Government and Industry Relationships*, 1998 Report of AIAA/ CEAS/ CASI.

[14]Hartmut Muller, "Space Tourism—New Business Opportunity or a Remaining Fiction," (Proceedings of the 47th Colloquium on the Law of Outer Space, AIAA, Virginia, 2005).

[15]See Thea Sinclair and Mike Stabler, *The Economics of Tourism* (London: Routledge, 1997), p. 15.

[16]Futron Corporation, "Space Tourism Market Study," (28 September 2004). Accessed 12 April 2006, available from http://www.futron.com/press/spacetravel.htm.

[17]Patrick Collins, "Space Activities, Space Tourism and Space Growth," (2nd International Symposium on Space Tourism, Bremen, 21-23 April 1999). Accessed 5 November 2004, available from http://www.spacefuture.com/archive/space_activities_space_tourism_and_economic_growth.shtml.

[18]Patrick Collins, "Meeting the Needs of the New Millennium: Passenger Space Travel and World Economic Growth," *Space Policy* 18, no. 3 (2002): 183-197.

[19]The proportion of food expenditure to total expenditure.

[20]Collins, "Space Activities."

[21]Declaration on Development and International Economic Co-operation United Nations General Assembly (UNGA) Resolution 3362 (S-VII) of 16 September 1975.

[22]For the background to the seventh session and the shift in approach from the sixth session, see Catherine B. Gwin, "The Seventh Special Session: Towards a New Phase of Relations Between the Developed and the Developing States?" in *The New International Economic Order: Confrontation or Cooperation Between North and South?* eds. Karl P. Savant and Hago Hasenpflug (London: Wilton House, 1977), p. 91.

[23]For a very critical view on the NIEO, see William Loehr and John Powelson, *Threat to Development: Pitfalls of the New International Economic Order* (Epping: Bowker, 1983).

[24]Ervin Laszlo, *The Objectives of the New International Economic Order* (Oxford: Pergamon Press, 1978), pp. 120-124.

[25]See the Charter of Economic Rights and Duties of States, Part IV(2) UNGA Resolution 3362 (S-VII) of 12 December 1974.

[26]UNGA Resolution 3361 (S-VII), Part IV(3).

[27]Jeffrey A. Hart, *The New International Economic Order: Conflict and Co-operation in North-South Economic Relations* (London: Macmillan, 1983), p. 147.

[28]World Tourism Organisation, "Why Tourism?" Accessed 12 April 2006, available

from http://www.world-tourism.org/aboutwto/eng/menu.html.
[29]Satellite Industry Association, *State of the Satellite Industry Report* (Washington: SIA, 2005).
[30]F.A.A./C.S.T., *The Economic Impact of Commercial Space Transportation on the US Economy 2004*, (February 2006). Accessed 12 April 2006, available from http://ast.faa.gov/files/pdf/EcoimpactReportweb06.pdf.
[31]Ibid.
[32]Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden Switzerland, and the United Kingdom.
[33]Pierre Lionnet, *Facts and Figures: The European Space Industry in 2004*, 2nd ed. (Paris: Eurospace, 2005), p. 6. Accessed 18 January 2006, available from http://perso.wanadoo.fr/eurospace/eurospacefandfdata2004.pdf.
[34]Ibid.
[35]Miltiades Chacholiades, *Principles of International Economics* (London: McGraw Hill, 1981), p. 174.
[36]H.R.1024, 109th Cong. (2005-2006).
[37]In 1926, 5,800 passenger tickets were sold; by 1930, this figure had risen to 417,000. In 1941, over four million passengers were carried on US domestic carriers. See Thomas A. Heppenheimer, *Turbulent Skies: A History of Commercial Aviation* (Chichester: John Wiley & Sons, 1995), pp. 22 and 124.
[38]Heppenheimer, *Turbulent Skies,* 5-17.
[39]Pamela L. Meredith and George S. Robinson, *Space Law: A Case Study for the Practitioner Implementing a Telecommunications Business Concept* (Dordreacht: Matrinus Nijhoff, 1992), Paragraph 2.4, pp. 42-49 and Paragraph 2.8, pp. 57-70.
[40]James Edward Sandford Fawcett, *Outer Space: New Challenges to Law and Policy* (Oxford: Clarendon Press, 1984), pp. 37-47. See Leo B. Malagar and Marlo Apalisok Magdoza-Malgar, "International Law of Outer Space and the Protection of Intellectual Property Rights," *Boston University International Law Journal* 17 (1999): 311, Karl-Heinz Böckstiegel, ed. *Project 2001—Legal Framework for the Commercial USE of Outer Space* (Carl Cologne: Heymans Verlag, 2002), Grier C. Raclin, "From Ice to Ether: The Adoption of a Regime to Govern Resource Exploitation in Outer Space," *North Western Journal of International Law and Business* 7 (1986): 727, and Joseph Bosco, "Practical Analysis of International Third Party Liability for Outer Space Activity—A US Perspective," *Trial Law Guide* 29 (1985): 302.
[41]As noted by Myres S. McDougal and Leon Lipsom, "Perspectives for a Law of Outer Space," *American Journal of International Law* 52 (1958): 407, it would have been impossible at the time of drafting to foresee and list all possible space activities.
[42]See Cheng, *Studies*, 215-264.
[43]See Maurice N. Andem, "The 1967 Outer Space Treaty as the Magna Carta of Contemporary Space Law," (Proceedings of the 47th Colloquium on the Law of Outer Space, Virginia: AIAA, 2005), paper no. IAC-04-IISL 3.10, p. 3.
[44]This concern is evidenced by the pre-OST resolutions by the UNGA; for example,

Resolution 1962 (XVIII) of 13 December 1963.

[45]This concern is also evidenced by the unanimously adopted UNGA. Resolution 1721 (XVI) of 20 December 1961, Resolution 1962 (XVIII) of 13 December 1963.

[46]See Olivier De Saint Lager, "Les Pays en Développement et le droit de Activités Spatiales," in *Droit de L'Espace—Aspects Récents*, ed. Jacqueline Dutheil de la Rochère (Paris: Editions Pedone, 1988), pp. 322-323.

[47]For example, United States Code 49, section 70113 (US) and Space Activities Act 1998 (Australia), S. 74 and 69(3).

[48]See H. G. Darwin, "The Outer Space Treaty," *British Yearbook of International Law* 42 (1967): 278, and Maurice N. Andem and Bin Cheng, "The 1967 Space Treaty," *Journal de Droit International* (1968): 532.

[49]See Wilfred C. Jenks, *Space Law* (London: Stevens and Sons, 1965), pp. 210-212.

[50]Article VI of the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies,* 27 January 1967, vol. 18 UST, p. 2410; TIAS, vol. p. 6347, 610 UNTS, p. 205; ILM (1967), pp. 6-386; Irish Treaty Series (1968), no. 7 . Entered into force 10 October 1967 (hereafter Outer Space Treaty).

[51]Convention on International Liability for Damage Caused by Space Objects, opened for signature 29 March 1972, vol. 965, no. 24 UST, p. 2389; TIAS, p. 7762; vol. 961, UNTS, vol. 961 p. 187; ILM (1971), p. 1; Irish Treaty Series (1972), no.7. Entered into force 1 September 1972 (hereafter referred to as Liability Convention).

[52]States that are not parties to the Outer Space Treaty and the Liability Convention still have a duty "to protect other states against injurious acts by individuals from within its jurisdiction" under the *Trail Smelter Arbitration* (*United States vs. Canada)*, Arbitral Tribunal, Montreal, 16 April 1938 and 11 March 1941; *United Nations Reports of International Arbitral Awards* (1947): 3, *American Journal of International Law* 33 (1939): p. 182, and *American Journal of International Law* 35 (1941): p. 716 The *Corfu Channel Case* (*U.K. v Albania* ICJ Reports [1947-48], 15 and 53) also noted that states have an obligation not to knowingly allow their territory to be used for acts that infringe the rights of other states.

[53]Cheng, *Studies*, 286-356. See Delbert D. Smith, *Space Stations* (Boulder, CO: Westview Press, 1979), pp. 117-128, and Damodar Wadegaonkar, *The Orbit of Space Law* (London: Stevens and Sons, 1984), pp. 22-27.

[54]Liability Convention, Article IV (1)(b).

[55]Ibid., Article IV(2).

[56]Ibid., Article VI(2).

[57]Ibid., Article IX. See Marco G. Marcoff, *Traité de Droit International Public de L'Espace* (Fribourg: Editions Universitaires Fribourg Suisse, 1973), p. 551.

[58]Liability Convention, Article VII.

[59]Council Directive 90/314/EEC on package travel, package holidays and package tours (OJL 158 of 23 June 1990, pp. 59-64), implemented in Ireland through the Package Holidays and Travel Trade Act 1995 (amending the Transport Tour

Operators and Travel Agents Act 1982).

[60]For example, under the Sale of Goods and Supply of Services Act 1980 (IR) No. 16.

[61]Sale of Goods and Supply of Services Act 1980 (IR), no. 16, Part IV, s.39 (a).

[62]Ibid., s.39 (b).

[63]Ibid., s.39 (c).

[64]Ibid., s.39 (d).

[65]See the comments of the European Court of Justice in Case C-168/00 *Leitner v TUI Deutschland GmbH & Co KG* (2002) ECR I-2631; (2002) All ER (EC) 561.

[66]See the comments of the Court in Case C-400/00 *Club-Tour, Viagens E Tourismo SA v Garrido* (2002) ECR I-4051.

[67]For example, the Commercial Space Launch Act 1988, USC 49 Section 70112(b).

[68]Also accepted by Michael Wollersheim "*Contributions Towards a Legal Framework for Space Tourism,"* (2nd International Symposium on Space Tourism, Bremen, 21-23 April 1999). Accessed 12 April, 2006, available from http://www.spacefuture.com/archive/considerations_towards_the_legal_framework_of_space_tourism.shtml. See Saligram Bhatt, *International Aviation and Outer Space Law and Relations* (New Delhi: Asian Institute of Transport Development, 1996) and James J. Hurtak, "Existing Space Law Concepts and Legislation Proposals," *The Academy of Future Science* (2005). Accessed 12 April 2006, available from http://www.affs.org/html/existing_space_law_concepts.html, Lawrence D. Roberts, "Planning a Trip into Space? Bring your Lawyer Along for the Ride," *Ad Astra* (May-June, 1998), Yasuaki Hashimoto, *"The Space Plane and International Space Law,*" (1994). Accessed 12 April 2006, available from http://www.spacefuture.com/archive/the_space_plane_and_international_space_law.shtml, and Cheng, *Studies,* 641.

[69]Lawrence D. Roberts, "Space Business Incentives: It's Time to Act," *Ad Astra* 8, no. 2 (1996): 38.

[70]See *Day v TWA Inc,* 528F 2d, p. 31 (2d Cir. 1975); *Evangelinos v TWA Inc,* 550Fd 1, p.52 (3rd Cir. 1976); *Hernandez v Air France* 545 F2d, p. 279; *Ricotta v Iberia Lineas Aereas de Espana*, 482 F. Supp. 497, 499 (EDNY 1979), 15 *Avi Rep* 17829; *Adatia v Air Canada* (1992) 2 S&B AV RV11/63; (1992) 1 *PIQR* 238; *McCarthy v Northwest Airlines Inc* 56 F.3d 313 (1st Cir. 1995), 1995 US App, Lexis 13295; *Galvin v Aer Rianta and Aer Charter* (1995) 3 IR 486 and *Burke v Aer Lingus PLC* (1997) 1 ILRM 148.

[71]*Air France v Saks* 470 US 392, p. 84, L. Ed. 2d p. 289, 105 S.Ct. 1338 (1985), adapted from *DeMarines v KLM Royal Dutch Airlines*, 580 F.2d p. 1193 (3d Cir. 1978) and *Warshaw v Trans World Airlines, Inc*., 442 F. Supp. 400 (E.D. Pa. 1977).

[72]*Gezzi v British Airways PLC*, 991 F.2d, p. 603, 605, note 4 (9th Cir. 1993).

[73]Malcolm Clarke, "Air Rage: Business Men Behaving Badly—Civil Liability for Uncivil Passengers," *Lloyd's Maritime and Commercial Law Quarterly* (2001): 369.

[74]*Wallace v Korean Air* 214 F.3d, pp. 293, 296 (2d Cir. 2000).

[75]See Andreas F. Lowenfeld and Allan I. Mendelsohn, "The United States and the Warsaw Convention," *Harvard Law Review* 80 (1966-67): 497-500, for a similar comment regarding air carriers' liability.
[76]Convention on International Carriage by Rail, 9 May 1980, 1397 UNTS 76, Article 32.
[77]Arthur C. Clarke, *Man in Space* (Netherlands: Time Life International 1971), p. 31.