

## THE IMPACT OF SPACE TOURISM ON THE INTERNATIONAL LAW OF OUTER SPACE

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The successful 'launch' of *SpaceShipOne* from its mother plane, *White Knight* in October 2004 followed by its second return journey in 7 days to an altitude of over 100 kilometres, demonstrated that the technology for short-term human suborbital flight had arrived. Entrepreneur Richard Branson subsequently announced plans to offer his Virgin Galactic passengers the opportunity of a 3½ hour journey into space. There are reports that hundreds of people have already reserved a \$200,000 seat on these flights, due to commence in 2008.<sup>1</sup>

Without doubt the prospect of commercial space tourism has begun to capture widespread imagination. Significant resources are being directed towards Reusable Launch Vehicle technology, vital for the development of the space tourism industry.<sup>2</sup> Many companies are developing the capability for civilian suborbital tourist flights, as well as 'value-added' products designed to enhance the space tourism 'experience'.<sup>3</sup>

One commentator has gone so far as to suggest that a traffic level of 5 million space passengers per year by 2030 is achievable. He envisages a sophisticated space tourism infrastructure including over 100 co-orbital hotels and orbital sports centres, as well as daily scheduled lunar flights to a series of lunar orbit and lunar pole hotels.<sup>4</sup> Even if these broad projections

are not achieved, it seems that some level of commercial space travel will be developed. Of course there have already been orbital tourist flights. In April 2001, American Dennis Tito spent 6 days in the Russian section of the International Space Station (ISS), after extensive training at the Star City complex. For the first time a passenger was able to pay for the privilege of participating in a mainstream space project involving actual orbital travel, including a stay on the world's most expensive 'hotel'. Following his journey, NASA became more open to the idea of space tourists within the context of the ISS project.<sup>5</sup>

In April 2002, South African Mark Shuttleworth became the world's second space tourist. This 'Afronaut' spent 8 days on the ISS conducting scientific experiments, including a number relating to the HIV virus. The symbolic relevance of his work - South Africa is one of the countries worst affected by the HIV/AIDS epidemic - provided a further 'credibility boost' to the idea of space tourism.

The prospects for both suborbital and orbital space tourism give rise to some interesting and conceptually difficult legal questions. This paper examines some of the more pressing issues to be addressed for the proper regulation of space tourism activities. Questions involving liability, property rights and the legal status of tourists are just some of the myriad issues that require careful thought. These

questions are all the more complex given the 'Common Heritage of Mankind' nature of outer space, which itself raises some broader ethical questions about space tourism activities.<sup>6</sup>

### **The Inadequacy of Existing International Legal Principles**

The 5 main multilateral space treaties were largely formulated in the 'Cold War' era, when only a relatively small number of countries had space-faring capability.<sup>7</sup> The treaties illustrate that, at the time, it was not anticipated that humankind would engage in commercial space tourism activities. The same can largely be said for the 5 main sets of space-related Principles adopted by the United Nations General Assembly.<sup>8</sup>

Despite providing a framework of fundamental principles, the existing international legal regime has not kept pace with much of the remarkable technological and commercial progress associated with space activities. This represents a major challenge, all the more in view of the strategic, military and commercial importance of outer space. The reality of a permanently occupied space station and the prospect of human settlements on celestial bodies raise new questions, as does the advent of large-scale private space tourism and space transportation activities.

What will eventually be required is the development of laws at the international level - supplemented by national legislation - which build upon and/or amend existing principles to address these issues. Without a uniform set of widely accepted international rules, the development of space tourism activities will be restricted. These emerging principles must strike a balance between providing certainty and appropriate minimum standards on the one hand, and the protection and encouragement of innovation on the other.<sup>9</sup>

### **What is Space Tourism and Does Space Law Apply?**

The term 'space tourism' has been defined as 'any commercial activity offering customers direct or indirect experience with space travel'<sup>10</sup> and a space tourist as 'someone who tours or travels into, to, or through space or to a celestial body for pleasure and/or recreation.'<sup>11</sup> These definitions immediately give rise to the fundamental question: What is space? As we know, from a strictly legal perspective, there is as yet no clear definition of outer space - or put another way - where (and how) air space ends and outer space begins. While outer space activities have continued to develop notwithstanding this uncertainty, there are important practical reasons why a clear legal distinction between 'commercial aviation flights' and 'commercial space flights'<sup>12</sup> should be determined, given the possible advent of space tourist activities - particularly involving suborbital flights.

This is even more appropriate given the fundamental differences between air law and outer space law. The Outer Space Treaty provides that '[o]uter space ... is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.'<sup>13</sup> This also reflects a customary law principle evidenced by the practice of States as early as the launch of Sputnik 1.<sup>14</sup>

In essence, outer space is 'free' for use - tourist activities that take place in outer space are not subject to prior consent. Of course, any space tourist activities requiring a launch from earth (or an air launch such as *SpaceShipOne*) and a return to earth will also involve a 'use' of air space. In this respect, the law of air space may be relevant to the legal position.

For the purposes of this paper, it is sufficient to note that, in contrast to the international law of outer space, air law regards air space as part of the 'territory' of

the underlying State. A well-established body of treaty law confirms that 'every State has complete and exclusive sovereignty over the airspace above its territory.'<sup>15</sup> This is also reflected in customary international law.<sup>16</sup>

Given the distinction in fundamental legal principles between air law and the international law of outer space, it is important to determine *what laws apply where*. There has, over the years, been controversy as to how far air space extends above the surface of the earth,<sup>17</sup> with none of the suggested methodologies having been accepted as a legal definition through the UNCOPUOS process. More recent developments in domestic space legislation may, however, herald a move towards a more widely recognised demarcation point.<sup>18</sup>

In the absence of an accepted demarcation, what laws should apply to space tourism? Should air law apply for part of the journey and space law then be applied at some (as yet undefined) point during the space tourism activity? This would be an unsatisfactory and impractical solution for a space tourism vehicle launched from earth, and lead to uncertainty in the absence of a clear defining point for the 'boundary' between air space and outer space. The development of a comprehensive and uniform legal regime encompassing the complete launch and return journey of private individuals should be preferred.

In the interim, the appropriate approach is to apply space law (with appropriate amendment and clarification) to the entire journey on the basis of the proposed function of the tourism spacecraft - that it involves a flight in(to) outer space.<sup>19</sup> The alternate 'exclusive' approach - to apply air law to the entire space tourism activity - appears unworkable given the lack of sovereignty in outer space.

This methodology of regulating space tourism is, however, complicated by 'hybrid' circumstances like the *SpaceshipOne* example, where there is a launch of a space vehicle from another vehicle in air space. The most appropriate way of regulating such flights under existing legal principles would be to apply air law to the 'combined' vehicle (that is before the launch) and then apply space law to *SpaceShipOne* from the moment it is launched until its return to earth. *White Knight* would always remain subject to air law. Even this pragmatic solution is somewhat unsatisfactory in that, in the event of an accident, the applicable legal regime will depend on when the accident occurs.<sup>20</sup>

### The Legal Status of Space Tourists

The existing corpus of international space law does not refer to space 'tourists', but does contemplate space travel by 'astronauts' and 'personnel of a spacecraft'. The Outer Space Treaty does not define an astronaut but stipulates that they are 'envoys of mankind' to which States are required to render 'all possible assistance'.<sup>21</sup> These obligations are further developed in the Rescue Agreement which, despite the use of the term 'astronauts' in its title and preamble, refers in its substantive provisions to the rescue and return of 'personnel of a spacecraft'.<sup>22</sup> Moreover, the Moon Agreement confirms that 'any person' on the moon is to be regarded - at least by parties to the treaty - as an astronaut.<sup>23</sup>

It is unclear whether a commercial space tourist would fall within the 'envoy of mankind' status accorded to an astronaut. It is, however, probable that space tourists would constitute 'personnel of a spacecraft', bringing them within the rescue and return obligations of the Rescue Agreement. Indeed, if this were not the case, those obligations would only extend to some of those onboard a space tourism

flight - for example the crew - but not the paying passengers. Given that the Rescue Agreement is 'prompted by sentiments of humanity',<sup>24</sup> it should be interpreted as applying to *all* persons involved in a space tourism flight.

Yet, this issue should be clarified. In early 2002, the participating Space Agencies in the ISS project reached agreement as to who was allowed on the ISS. This covered both 'professional astronauts/cosmonauts' and 'spaceflight participants', which included those on 'commercial, scientific and other programmes, crewmembers of non-partner space agencies, engineers, scientists, teachers, journalists, filmmakers, or tourists'.<sup>25</sup> The agreement does require these participants to sign a Code of Conduct - as is the case for crew members of the ISS - but the inclusion of non-professional tourists on board space vehicles will necessitate acceptance by them of some minimum standard of behaviour and care.

Another issue relating to the status of space tourists stems from the Liability Convention, which expressly does not apply to damage caused to '[f]oreign nationals *during such time as they are participating in the operation of that space object*'.<sup>26</sup> Space tourists would generally not fall within this exception, since they would not normally be performing such tasks. Yet, this may depend upon the specific functions (if any) undertaken by the tourist while on board the space object. (For example, was Shuttleworth, by conducting his experiments, participating to any greater degree in the operation of the ISS than Tito?).

### **The Development of Celestial Property Rights?**

The fundamental 'non-appropriation' principle within the international law of outer space reflects a desire that outer space remains an area beyond the jurisdiction of any State(s). Similar ideals emerge from

UNCLOS (in relation to the High Seas) and the Antarctic Treaty,<sup>27</sup> although the latter was finalised after various claims of State sovereignty had been made and therefore was structured to 'postpone' rather than prejudice or renounce those claims.<sup>28</sup>

In the case of outer space, its exploration and use is expressed in Article I of the Outer Space Treaty to be 'the province of all mankind'. States are free to engage in space activities without reference to the sovereign claims of other States. This is reinforced by other parts of the same provision and repeated in the Moon Agreement.<sup>29</sup>

Even though both the scope for space activities and the number of private participants have expanded significantly since these treaties were finalised, some suggest that the non-appropriation principle still constitutes 'an absolute barrier in the realization of every kind of space activity'.<sup>30</sup> The capital required to research, trial and implement a new space activity is significant. For such an activity to become a viable 'stand alone' commercial venture takes many years. For a private enterprise contemplating such an activity, the security of legal rights available to protect its investment is an important element in its decision to allocate these time and economic resources. Patent and other intellectual property rights, for example, are vital prerequisites for private research activity on the ISS. These rights are specifically addressed by the Agreement between the Partners to the project.<sup>31</sup>

In relation to space tourism activities, not only intellectual property rights (how is the 'Virgin' label to be protected in outer space?), but also other forms of tangible property rights may become relevant. To take one example, it has been suggested that as space tourism activities develop, demand will arise for the constant presence of tourists on the moon (and other celestial bodies), necessitating the construction of

celestial hotels. Naturally it will be important for the 'owner' to gain some legal protection in relation to the site of the hotel - perhaps akin to some form of a leasehold (or even freehold) title common on earth. Here the problem presents itself: it is not possible under existing international space law to assert that any particular sovereign jurisdiction applies to the area on which the hotel is to be constructed. Without the right of any State to exercise jurisdiction - that is to make (and enforce) laws - it is difficult to determine *how* such a title can be established.

The existing international law of outer space deals with issues of jurisdiction through a system of registration. Under the Outer Space Treaty, 'jurisdiction and control' over a space object and its personnel 'while in outer space or on a celestial body' is vested in the State that registers that object pursuant to the Registration Agreement.<sup>32</sup> The definition of a 'space object' is vague and is unlikely to include a stationary (semi-) permanent celestial hotel.<sup>33</sup> Even if it could be interpreted to fall within the meaning of a space object, this would only solve the jurisdictional questions relating to *inside* the hotel but not to the surface of the moon.

The Moon Agreement does not provide an answer to this lack of a jurisdictional base upon which to assert property rights over the area upon which a space hotel would be constructed. Indeed, the treaty expressly provides that the surface (and subsurface) of the moon 'shall [not] become property of any State, international intergovernmental or nongovernmental organization, national organization or nongovernmental entity or of any natural person'.<sup>34</sup> In theory, there would remain under current space law a right of free access to that area. The construction of the hotel - and presumably its location in a specific site - cannot interfere with the activities of other parties to the treaty. The Moon Agreement does not specify the consequences of a breach of

these requirements therefore illustrating the uncertainties under existing international space law.

Nevertheless, the Moon Agreement contemplates exploitation and removal of the natural resources of the moon - albeit under the management of an international regime established for that purpose. This at least suggests a property right akin to a 'mining license'. It is not clear where the legal basis of these rights lies, apart from any specific procedures established by the management regime itself.

These are very difficult issues and go to the fundamental core upon which the international law of outer space has been developed. The question of property rights is, of course, not peculiar to space tourism activities. However, the development of these activities - including the possibility that they will eventually lead to permanent settlements or 'colonies' in space - highlights the need to 'update' international space law. This requires a clear outline of any formal property rights that can be 'acquired' by private entities seeking to undertake space tourism activities.

### **Safety Issues and Liability for Space Tourists and Third parties**

The *Columbia* disaster again illustrated the hazardous nature of space travel and reinforced the need for the highest possible safety regulation standards for commercial space tourism. Of course this should be the case with human space travel already; however the enormous costs associated with addressing every foreseeable contingency have meant that human space travel has, to date, involved trade-offs between design and what are deemed as 'acceptable' risks. Yet the loss of 2 (of the original 5) shuttles after only 113 flights is an unacceptably high failure rate for any activity open to the public, and even exceeds NASA's own safety requirements.<sup>35</sup>

Not only must there be appropriate safety standards for the design, construction and operation of a space tourism vehicle, but a system of responsibility and liability must be established at the international level - supplemented by domestic law - to regulate those circumstances where a space tourist suffers injury, loss or damage, so as to remove uncertainties and ensure that proper risk avoidance procedures are in place.

In this regard, existing international space law is inadequate. Although it was contemplated that 'national activities in outer space' might be undertaken by nongovernmental entities, the Outer Space Treaty provides that responsibility will still lie with States. Even though the range of space activities and the number and type of participants has grown exponentially, this remains the position today. States are required to authorize and continually supervise national activities in outer space undertaken by nongovernmental entities pursuant to Article VI of the Outer Space Treaty. This also reflects customary international law and thus binds all States.

Flowing on from this 'state-oriented' system of responsibility, Article VII of the Outer Space Treaty, together with the more detailed regime in the Liability Convention, impose an international obligation of liability on the 'launching State(s)' for certain specified damage caused by a space object on a joint and several basis.<sup>36</sup> This is one of the reasons behind the growing number of national space laws enacted by space faring States, the terms of which pass financial responsibility to private entities for (at least a part of) the amount of compensation for which the relevant State may be liable at the international level.

Even where damage is suffered by individuals, only the relevant State(s) can institute the Liability Convention procedures. This requires political will on the part of that State to present a claim to a

launching State. To date no such formal claim has been made.

Space tourists themselves are unable to claim for compensation under the Liability Convention. While they could institute legal proceedings under national laws, there are limitations - such as sovereign immunity - that may represent a bar to a claim for compensation.<sup>37</sup> In addition, given the private contractual nature by which most space tourism activities will operate, it is likely that carefully drafted exclusion of liability clauses would be invoked. Even though the domestic legislation of various States may seek to regulate the industry and provide for certain standards and protections, there is the danger of a lack of uniformity.

It is thus preferable that, in addition to relevant domestic legislation, a uniform and comprehensive regime for passenger liability arising from space tourism activities be developed at the international level. These rules should allow for direct private claims by passengers and operate from the launch until the return to a final destination.

It will be necessary to determine exactly how this new liability regime allows for effective private remedies. A starting point would be to consider not only the provisions of the Liability Convention, but also the international regime established in relation to liability for death or injury of passengers during commercial air travel. In doing so, however, it must be remembered that the regime for the airline industry was structured specifically to meet the peculiarities of that industry and, in any event, experience has shown that it would not necessarily be an ideal model for the unique characteristics and enormous costs associated with space tourism.<sup>38</sup>

A consideration of both legal regimes immediately gives rise to some fundamental questions. Should space tourism activities

be subject to absolute liability, as is the case for certain damage caused by a space object under the Liability Convention,<sup>39</sup> or be based primarily upon principles of negligence, as exists under the international law of air space? Similarly, should the quantum of the liability be unlimited, as is the case under the Liability Convention, or is it appropriate to prescribe upper limits of liability as specified in the Warsaw Convention?<sup>40</sup> On the question of unlimited liability, there have already been calls from a leading commentator for a limited liability regime for launching States.<sup>41</sup> Some may argue that space tourists voluntarily accept the inherent risks associated with space travel and that liability should therefore be limited.

Whatever the final form of the regime, the existing rules of space law, which rely solely on State responsibility and liability, are not entirely appropriate for an industry that will principally be undertaken as a private commercial venture. A new multilateral treaty should be developed to establish a system of liability that attaches to those private operators conducting space tourism activities. This new regime must also address third party liability.<sup>42</sup>

This will also necessitate an effective space tourism insurance market. The advent of public commercial space tourism activities will bring with it the need for new and complex risk management assessment. It will be important to ensure that the legal regime for liability for such activities, as well as the terms and conditions of any tourism services agreement between passengers and operators, are matched by the availability of appropriate insurance coverage, with no significant 'gaps'.<sup>43</sup>

### **Some Ethical Dimensions of an International Legal Regime for Space Tourism**

Even if we assume that the expansion of our universe (quite literally) through space

tourism is a positive, almost inevitable direction for humankind, it is not only the 'hard law' provisions that require reassessment. There are complex ethical questions relevant to the direction of future developments of international (and national) space law. A number of these are briefly raised below.

#### **What are 'Appropriate' Space Tourism Activities?**

Despite its travails, the ISS represents a first example of humankind's efforts to make the space environment 'part of its domain'.<sup>44</sup> The evolution of space tourism activities will not only make space more accessible to human beings, but will also reinforce this constant human presence in outer space. This is not of itself incompatible with the Common Heritage of Mankind nature of outer space, provided that the rules regulating such activities ensure that these concepts are properly protected.

In this regard, many questions arise which will influence the way the international law of outer space should regulate future space tourism activities. For example, what sort of space tourism activities are 'appropriate'? Should there be any restriction on the nature of these activities to preserve the 'integrity' of outer space? On what basis, if any, should these restrictions be determined? Would it be acceptable, for example, to allow advertising billboards to be constructed, or casinos or even brothels to be established on the moon to cater to space tourists? How do space tourism activities correlate with the underlying philosophy of international space law - that the exploration and use of outer space 'shall be carried out for the benefit and in the interests of all countries'?<sup>45</sup>

As the capability of space-related technology advances, these qualitative questions must also be addressed in order to prioritise those activities that most closely accord with the overall goals associated

with humankind's ongoing endeavours in space.

### Pollution of the Space Environment

The protection of the natural environment of outer space is an important element in the Common Heritage of Mankind principle.<sup>46</sup> The international law of outer space makes some reference to environmental protection, though these provisions are neither sufficiently detailed nor rigorous when compared to UNCLOS.<sup>47</sup> The main provision concerning environmental protection in the Outer Space Treaty (Article IX) is ill defined and imposes only minimal obligations on States. In addition, there is currently no definition of 'space debris' under international space law and thus no mechanisms to regulate it. Relatively little has been done to tighten the legal requirements relating to the environmental protection of outer space, principally due to the significant costs associated with 'clean' space technology and practice.

Space tourism activities will inevitably result in greater pressures on the environment of earth –there are claims that space tourist vehicles will become the world's primary source of carbon dioxide emissions<sup>48</sup> – and of space. They will lead to the pollution of previously pristine areas. In contrast, however, to the imposition of rules relating to space debris, the control of human activities like littering would cost relatively little in dollar terms to regulate. It is imperative that this is done to minimise disruption to the space environment.<sup>49</sup>

Moreover, as space tourism activities become more sophisticated, it will be necessary to construct infrastructure - hotels, dams, roads and other 'conveniences' - on the moon and (perhaps) other celestial bodies. As has been the case on earth, mistakes will be made and there will be environmental accidents. Even though it envisages exploitation of the

moon's natural resources, the Moon Agreement imposes obligations on parties to protect 'the existing balance of its environment'.<sup>50</sup> The construction of space tourism infrastructure on the moon will alter its environment. There is a conflict between the development of space tourism activities and any environmental protection principles that form part of international space law. It will therefore be necessary to establish clear guiding principles to regulate such activities.

### Protection of the 'Heritage' of Space

As well as protecting the space environment from pollution, it is also appropriate to consider important sites in outer space that are (and will be) historically significant. Legal regulation will be required to provide for 'heritage sites' and 'national parks' in order to protect particular areas - such as the site of the first lunar landing by humans - from accidental or deliberate damage by space tourists.<sup>51</sup> The development of a 'Space Heritage Treaty' may be necessary to minimise access by tourists to these areas - once disturbed, Neil Armstrong's footprints would be gone forever.

An even more complex issue - whose heritage space is - will need to be reassessed in the future. How should we regard those human inhabitants of future space colonies, particularly those born and who live their entire lives in outer space, perhaps in a settlement on the moon? What are their rights and how do they relate to (or differ from) those international legal rules for outer space that have evolved on earth?

These are, obviously, difficult questions and will not arise in the near future, though they represent important elements in the overall planning of an appropriate international legal regime for human activities in outer space, including space tourism. It will be important to develop comprehensive and universal ethical



standards and practices to deal with the continued utilisation of space in this way.

## Concluding Remarks

Bin Cheng has noted that an essential element for effective rulemaking at the international level for space activities is a 'perceived need on the part of the states concerned' to devise or change certain rules.<sup>52</sup> The impending development of space tourism activities makes it appropriate to begin a process of reflection on the broad fundamentals of the international law of outer space.

The corpus of existing space law represents an important base from which to develop the legal tools to properly regulate the next stage of space activities. Yet it is not sufficient even for present purposes, let alone for the coming decades. The advent of space tourism raises many unanswered legal questions, some of which have been highlighted in this paper. Other legal issues will also arise. As more space tourism (and other) activities take place, appropriate dispute resolution procedures must be agreed to deal with conflicts that will arise, both at the public and private international law level. Detailed traffic and coordinated management systems must be developed. A clear and comprehensive legal framework must be established at the international level to reflect the wishes of the wider (global) community and to provide certainty.

At the same time, however, the broader philosophical and ethical aspects of human activities in outer space - indeed the place of human beings in the universe - demand that we continually reassess the *why* and *what* in relation to our ongoing exploration and use of outer space. It is essential that the underlying notions of cooperation and shared benefit remain as cornerstones in this next phase of human achievement

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For a more detailed discussion of some of the issues canvassed in this paper, see Steven Freeland, *Up, Up and...Back: The Emergence of Space Tourism and its Impact on the International Law of Outer Space*, forthcoming in 6:1 Chicago. J Int L (2005), as well as the references therein.

<sup>1</sup> Eddie Fitzmaurice, *Beam Me Up, Richard*, The Sun-Herald 52 (October 24, 2004). However, this may be delayed as a result of United States export control requirements: Irene Mona, *Red Tape for SpaceShipTwo*, Space Daily (April 26, 2005), at <<http://www.spacedaily.com>> (visited May 5, 2005).

<sup>2</sup> Charity Trelease Ryabinkin, *Let There be Flight: It's Time to Reform the Regulation of Commercial Space Travel*, 69 J Air L & Comm 101, 103 (2004).

<sup>3</sup> *Space Adventures Offers Ecliptic's RocketCam for Private Spaceflights*, Space Daily (April 26, 2005), at <<http://www.spacedaily.com>> (visited May 11, 2005).

<sup>4</sup> Patrick Collins, *Towards Space Tourism: The Challenge for British Space Policy*, 55:5/6 J Brit Interplanetary Soc 148, 148-49 (2002).

<sup>5</sup> In September 2001, NASA released its new policy on commercialisation of its manned space activities. This envisaged the opening up of space shuttle flight opportunities, and possibly also crew slots on the ISS, to private-sector personnel: United Nations, Office for Outer Space Affairs, *Highlights in Space 2001*, 25, UN Doc ST/SPACE/8 (2002).

<sup>6</sup> This concept was developed in discussions leading to the United Nations Convention on the Law of the Sea (1982), 1833 UN Treaty Ser 3 (1984) (UNCLOS). Article 136 of UNCLOS declares that '[t]he Area [i.e. the sea-bed and ocean floor and subsoil thereof beyond the limits of national jurisdiction] and its resources are the common heritage of mankind.' Article 11 of the Agreement Governing the Activities of States on the Moon and other Celestial Bodies 1363 UN Treaty Ser 3 (1979) (Moon Agreement) declares that '[t]he moon and its natural resources are the common heritage of mankind.'

<sup>7</sup> (i) Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies 18 UST 2410 (1967) (Outer Space Treaty); (ii) Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement); (iii) Convention on International Liability for Damage Caused by Space Objects 672 UN Treaty Ser 119 (1968) 24 UST 2389 (1972) (Liability Convention); (iv) Convention on Registration of Objects Launched into Outer Space 28 UST 695 (1975)

(Registration Agreement); and (v) The Moon Agreement.

<sup>8</sup> (i) Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, General Assembly Res No 1962, UN Doc No A/RES/1962 (1963); (ii) Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting, General Assembly Res No 37/92, UN Doc No A/RES/37/92 (1982); (iii) Principles Relating to Remote Sensing of the Earth from Outer Space, General Assembly Res No 41/65, UN Doc No A/RES/41/65 (1986); (iv) Principles Relevant to the Use of Nuclear Power Sources in Outer Space, General Assembly Res No 47/68, UN Doc No A/RES/47/68 (1992); and (v) Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries, General Assembly Res No 51/122, UN Doc No A/RES/51/122 (1996).

<sup>9</sup> For a discussion on the merits of Government protection of emerging space industries (in this case the private launch industry in the United States), see Tanja L. Masson-Zwaan, *The Martin Marietta Case: Or How to Safeguard Commercial Space Activities*, 18:1 A & Space L 16 (1993).

<sup>10</sup> Stephan Hobe and Jürgen Cloppenburg, *Towards a New Aerospace Convention?—Selected Legal Issues of "Space Tourism"* (unpublished paper presented at 47th Colloquium of the International Institute of Space Law, Vancouver, October 2004) (on file with author).

<sup>11</sup> Zeldine Niamh O'Brien, *Liability for Injury, Loss or Damage to the Space Tourist* (unpublished paper presented at 47th Colloquium of the International Institute of Space Law, Vancouver, October 2004) (on file with author).

<sup>12</sup> R. Thomas Rankin, Note, *Space Tourism: Pack, Ugly T-Shirts, and the Law in Outer Space*, 36 Suffolk U L Rev 695, 697 (2003).

<sup>13</sup> Outer Space Treaty, art II.

<sup>14</sup> *North Sea Continental Shelf Cases (Germany v Denmark; Germany v Netherlands)*, 1969 ICJ 3, 230 (February 20, 1969) (separate opinion of Judge Lachs).

<sup>15</sup> Convention on International Civil Aviation 59 Stat 1693 (1947) (Chicago Convention), art 1.

<sup>16</sup> In *Case Concerning Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States)* (merits) the International Court of Justice noted that '[t]he principle of respect for territorial sovereignty is also directly infringed by the unauthorised overflight of a state's territory by aircraft belonging to or under the control of the government of another state.' 1986 ICJ 14, 128 (1986).

<sup>17</sup> On 3 December 1976, eight equatorial States -

Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda and Zaire - signed the Bogotá Declaration (reprinted in English in 6:2 J Space L 193 (1978)), which asserted that, in the absence of any legally determined upper limit to air space, those segments of the geostationary orbit (located approximately 36,000 kilometres directly above the equator) above their territory constituted part of their respective sovereign territories. This assertion has not been accepted by other States and is not considered to properly reflect international law.

<sup>18</sup> The Australian Space Activities Act 1998 (Cth) (No 123 of 1998), as amended by the Space Activities Amendment Act 2002 (Cth) (No 100 of 2002), incorporates into the definition of a 'launch', a 'launch vehicle', a 'return', and a 'space object' for the purposes of the legislation a reference to 'the distance of 100 [kilometres] above mean sea level'. This was, as far as this author is aware, the first example of domestic law that refers to a specific 'demarcation point' for the purposes of applying space-related regulation. This author understands that this demarcation point has also been applied in the definition of a 'space object' for the purposes of Treasury Regulations (but not legislation) in the Isle of Man (correspondence from Christopher Stott, on file with author). Should this approach eventually be extensively adopted and followed elsewhere, it may represent evidence tending towards the eventual creation of a new customary international rule. For a discussion of the Australian legislation and its relationship to Australia's current space engagement policy see Steven Freeland, *When Laws are not Enough - The Stalled Development of an Australian Space Launch Industry*, 8 U Western Sydney L Rev 79 (2004) and Steven Freeland, *Difficulties of Implementing National Space Legislation as Exemplified by the Australian Approach*, forthcoming in Stephan Hobe, Bernard Schmidt-Tedd and Kai-Uwe Schrogl (eds), *Proceedings of an International Symposium 'Global and European Challenges for Air and Space Law at the Edge of the 21<sup>st</sup> Century'*, Cologne, June 8-10 2005.

<sup>19</sup> See Bin Cheng, *International Responsibility and Liability for Launch Activities*, 20:6 A & Space L 297, 299 (1995).

<sup>20</sup> See Hobe and Cloppenburg, note 10 above.

<sup>21</sup> Outer Space Treaty, art V.

<sup>22</sup> Rescue Agreement, arts 1-4.

<sup>23</sup> Moon Agreement, art 10.

<sup>24</sup> Rescue Agreement, preamble.

<sup>25</sup> *Final Frontier Now Open—But Visa Still Required*, Space Daily (February 5, 2002) at <<http://spacedaily.com>> (visited April 10, 2002). In late 2004, the United States Congress and Senate passed the Commercial Space Launch Amendments Act of 2004, Pub L No 108-492 (2005), which provides for amendments to Commercial Space Launch Act of 1984, 49 USC § 70101 (2004), in

order to permit human space flight by private corporations. The legislation distinguishes between the 'crew' of a space vehicle, who in the course of his/her employment 'performs activities . . . directly relating to the launch, reentry, or other operation of or in a launch vehicle or reentry vehicle that carries human beings' and a 'space flight participant'.

<sup>26</sup> Liability Convention, art VII(b) (emphasis added).

<sup>27</sup> 12 UST 794 (1959).

<sup>28</sup> *Id.*, art IV.

<sup>29</sup> Moon Agreement, art 1. Article I of the Outer Space Treaty provides that outer space 'including the moon and other celestial bodies, shall be free for exploitation and use by all States' and that there shall be 'free access to all areas of celestial bodies.' Article 4(1) of the Moon Agreement provides that '[t]he exploration and use of the moon shall be the province of all mankind.'

<sup>30</sup> I.H. Ph. Diederiks-Verschoor, *An Introduction to Space Law* 28 (Kluwer Law 2d ed 1999).

<sup>31</sup> The Partners in the ISS Project are the United States, Russia, Japan, Canada, and eleven Member States of the European Space Agency (Belgium, Denmark, France, Germany, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom). Article 21 of the Agreement Concerning Cooperation on the Civil International Space Station, 41 ILM 1481 (1998), specifically deals with jurisdictional issues relating to intellectual property rights on board the ISS.

<sup>32</sup> Outer Space Treaty, art VIII.

<sup>33</sup> Article I(b) of the Registration Agreement provides that a space object 'includes component parts of a space object as well as its launch vehicle and parts thereof'.

<sup>34</sup> Moon Agreement, art 11(3).

<sup>35</sup> Paul Recer and Broward Liston, *More Shuttles Are Likely to be Lost, Safety Panel Tells NASA*, Sydney Morning Herald 16 (March 28, 2003).

<sup>36</sup> Article 1(c) of the Liability Convention defines a launching State as follows: '(i) A State which launches or procures the launching of a space object; (ii) A State from whose territory or facility a space object is launched'. For a discussion of the terms of the Liability Convention, see Steven Freeland, *There's a Satellite in my Backyard!—Mir and the Convention on International Liability For Damage Caused by Space Objects*, 24 U New South Wales L J 462 (2001).

<sup>37</sup> In relation to the issue of sovereign immunity in United States courts in respect of claims under the Federal Tort Claims Act, 28 USC §§ 1346(b), 2671–80 (1994), see Lauren S.-B. Bornemann, *This Is Ground Control to Major Tom ... Your Wife Would Like to Sue but There's Nothing We Can Do ... The Unlikelihood that the FTCA Waives Sovereign Immunity for Torts Committed by United States Employees in Outer Space: A Call for Preemptive Legislation*, 63 J Air L & Comm 517 (1998).

<sup>38</sup> The limitation of liability has meant that claimants are often tempted to sue aircraft manufacturers instead in an attempt to obtain a higher level of compensation: Malcolm N Shaw, *International Law* 470 (Cambridge 5th ed 2003).

<sup>39</sup> Article II of the Liability Convention provides that '[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 in flight'. However, if the damage is caused 'elsewhere than on the surface of the earth', liability only arises where the damage is due to 'fault' by those responsible for the space object causing the damage. *Id.*, art III.

<sup>40</sup> The Warsaw Convention, as amended, provides for upper limits for liability in relation to the carriage of passengers and of baggage and cargo as well as dealing with areas of responsibility and insurance. Article 20(1) exonerates the carrier from liability where it or its servants and agents 'have taken all necessary measures to avoid the damage or that it was impossible for him or them to take such measures'. The Montreal Convention was designed to supersede the Warsaw Convention and removed the system of arbitrary limits on air carrier liability by providing that the carrier was liable for the full amount of the damages unless it could demonstrate that it was not negligent or that a third party was solely responsible for the damage: Montreal Convention, art VI. See also Shaw, note 38 above at 471.

<sup>41</sup> See, for example, International Law Association, *Report of the Seventieth Conference* 209 (April 2002) (comment of Carl Q. Christol).

<sup>42</sup> The Convention on Damage Caused by Aircraft to Third Parties on the Surface, 310 UN Treaty Ser 181 (1952), deals with issues of third party liability in respect of commercial air activities. Paragraph 1 of the preamble is intended 'to ensure adequate compensation for persons who suffer damage caused on the surface by foreign aircraft, while limiting in a reasonable manner the extent of the liabilities incurred for such damage in order not to hinder the development of international civil air transport'.

<sup>43</sup> For a discussion of the various factors relevant to the provision of insurance for current (non-tourism) space activities, see Richard Ritorto and Michael S. Mitchell, *Telecommunications Satellite Insurance*, 18:3 A & Space L 136 (1993).

<sup>44</sup> Mark Williamson, *Space Ethics and Protection of the Space Environment*, 19 Space Poly 47, 47 (2003).

<sup>45</sup> Outer Space Treaty, art 1.

<sup>46</sup> A.A. Cocca, *Settlements and Environmental Protection in The Law of Outer Space*, 44 Proceedings of the Colloquium on the Law of Outer Space 337 (2002).

<sup>47</sup> UNCLOS provides for an express obligation to protect the marine environment and facilitates this in

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relation to the High Seas by providing for port-state jurisdiction over pollution offences.

<sup>48</sup> George Monbiot, *Lost in Space*, *The Guardian* (November 13, 1999), at <<http://www.monbiot.com>> (visited May 31, 2005).

<sup>49</sup> It is interesting to note that as this paper was being written, the parties to the Antarctic Treaty concluded a Protocol which, in part, imposes a 'polluter pays' regime. This will also be applied in relation to the 30,000 tourists to the region each year: *Deal Reached on Making Polluters Pay in Antarctica*, *Terra Daily* (June 17, 2005), at

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<<http://www.terradaily.com>> (visited June 21, 2005).

<sup>50</sup> Moon Agreement, art 7.

<sup>51</sup> It is interesting to note that Article 7(3) of the Moon Agreement contemplates the designation of areas of the moon and other celestial bodies having 'special scientific interest' as 'international scientific preserves for which special protective arrangements are to be agreed upon'.

<sup>52</sup> Bin Cheng, *The Commercial Development of Space: The Need for New Treaties*, 19 *J Space L* 17, 43 (1991).