

## Developing a Legal Regime for Space Tourism: Pioneering a Legal Framework for Space Commercialization

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### Abstract

Space Tourism, considered not an area of priority for commercialization, has never been so heatedly discussed until the historic arrival of two "unexpected" tourists. The development of space tourism no doubt calls for a legal regime, which can better regulate the market and offer clear guidance and expected outcome for the business. It has been widely argued that the existing international space treaties are ill-fitted for space commercialization. The development of a legal regime appears all the more important, even before the space tourism becomes expendable for most people. As long as the space travel technology is mature, there are always business opportunities for space tourism. The present paper discusses the potential for a commercial space tourism industry and advocates a legal regime.

*"Just tell me the general idea you have in mind—the idea Sven and my daughter keep so mysteriously to themselves. What is this thing that's so revolutionary and so daring? Fantastic and at the same time logical? I'm quoting, of course, my daughter." He looked steadily at Lee. His eyes brightened as if an inner light had been turned on. Lee glanced at the architect and the girl. He found response in their faces. "I need your assistance in building a hotel in outer space," he said artlessly.<sup>1</sup>*

### 1. Introduction

A story like the above must be the truly classic scene for space futurists. Outer space exhibits an unlimited source for the imaginative science fiction writers. Earlier in the mid-19<sup>th</sup> century a number of science fiction stories have been written showing the rich imagination from renowned authors.<sup>2</sup> Space tourism was among the most popular topics for those writers. But no one has taken this idea so seriously at that time as in the late 20<sup>th</sup> century.

The successful launch of first satellite-Sputnik I in 1957<sup>3</sup> and Gagarin's first manned space flight in 1961<sup>4</sup> marked a breakthrough in space history. The rapid development of space technology brings the dream of conquering outer space to a reality. State monopoly has been the typical characteristic of space activities since the launch of Sputnik I. The space treaties formulated by the United Nations (UN) also acknowledged this

fact, which has been well justified by the large amount of investment and the long period of time needed to realize the

benefits. However, private parties have increasingly shown interests in space activities, posing severe challenges to the former regime.

Space tourism, considered not an area of priority for commercialization, has never been so heatedly discussed until the historic arrival of two "unexpected" tourists—American Dennis Tito and the twenty-eight year-old South African multimillionaire Mark Shuttleworth—at the International Space Station (ISS) in April 2001<sup>5</sup> and April 2002<sup>6</sup> respectively. The ISS partners officially cleared the way for space tourism with the approval of the two visits.<sup>7</sup> However, even at this time, space tourism proves to be an exorbitant consumption, except for some tycoons. As reported, Tito and Shuttleworth flew to the ISS for an amount of US \$ 20 million each<sup>8</sup>. This amount is forbidding to most people.

However, market research has clearly demonstrated that many people have strong interest in a space travel with a less amount; the many people's wishes can be met with the development of reusable launch vehicle (RLV) technology, which could reduce space launch costs from \$ 10,000 per pound to \$ 1,000 per pound.<sup>9</sup> Just as Bachula stated, "reliable, affordable access to space is a fundamental prerequisite if we are to realize the full potential of the outer space frontier."<sup>10</sup>

The development of space tourism no doubt calls for a legal regime, which can better regulate the market and offer clear guidance and expected outcome for the business. It has been widely argued that the existing international space treaties are ill-fitted for space commercialization. The development of a legal regime appears all the more important, even before the space tourism becomes expendable for most people. It is noted that the Russian Space Agency had intended to send two civilians into outer space every calendar year until the February 1, 2003 Space Shuttle Columbia disaster.<sup>11</sup> Space tourism is also an interesting topic in China. It has been reported the first Chinese is expected to have space travel as early as in 2006.<sup>12</sup> More

similar reports are expected from other nations in the coming period.

Consequently, a legal regime for space tourism is indispensable, no matter whether the RLVs can be successfully developed in the near future or not. As long as the space travel technology is mature, there are always business opportunities for space tourism. The present paper discusses the potential for a commercial space tourism industry and advocates a legal regime. Part 2 offers a comparison of space and air travel and the rules applicable to each traveling means. This part further proposes an appropriate liability regime for space travel, trying to borrow the experience from air transportation. Part 3 examines the appropriate level of state interference through licensing measure. Part 4 specifically discusses the status of space tourists, as differed from astronauts. Part 5 concludes that current space law inadequately addresses space tourism and that the inadequacies justify an urgent need to develop an appropriate legal regime for the development of space tourism.

## 2. Space Travel and Air Transportation: Different Applicable Law

The Wright Brothers' successful fly at Kitty Hawk in 1903 opened a new era for the transportation history. The international society was quick to respond to the legal need for commercial air transportation: the historic Warsaw convention was formulated in 1929 to develop a forward-looking international aviation regime. The regime proved to be vital to the development of the air transportation industry by shielding the fledgling airline industry from cost-prohibitive insurance premiums and unlimited liability for accidents.

Space travel stands exactly at the same crossroad as air transportation in the early 1920s. The potential liability for accidents is a major obstacle. The legal vacuum in this respect deters the commercializing process of space travel. Insurance is not the way out since the huge insurance for space travel will be passed on to the tourists and the ticket price will go far beyond a reasonable level as to kill the whole space industry. Accordingly, the formulation of appropriate liability regime for space travel appears all the more important.

Air transportation and space travel share a number of similarities, this leads to the discussion of the possibility of extending the above regime to space travel. The discussion again goes back the classic question on the

boundary of outer space and air space, and thus the application of air law and space law.

Outer space begins where territorial air space ends. Although there is as yet no internationally recognized boundary of outer space,<sup>13</sup> which constitutes one major obstacle preventing a proper definition of outer space, it has been widely accepted that air law and space law, as two different branches of international law, should apply to air space and outer space respectively.<sup>14</sup> Striking criteria for applicable law include purpose and function, technical configuration and capabilities, and the medium where the operation predominantly takes place.<sup>15</sup> Space travel, as denoted by its concept, has clearly classified itself as activities in outer space; furthermore, activities in sufficient distance from the Earth have no problem in justifying the application of space law for space travel.

The air transportation regime, characterized by state sovereignty over air space, substantially differs from the space travel regime where no state can claim sovereignty over outer space. This fundamental difference justifies the necessity of developing a distinct legal regime for space travel. Nevertheless, we should not neglect the fact that air transportation and space travel, though in different geographical locations, are basically transportation in essence. While the vehicles used for space tourism are rocket-powered and designed to enter outer space, they take off and land like airplane.<sup>16</sup> Taking space vehicles to outer space will be like taking an airplane for the travelers, although the destinations are different. Space travel, while still in its infant stage, share much similarity as the air transportation industry in its early stage. The question posed to the air transportation industry comes to space travel now: how to alleviate the liability so that the regime can effectively promote the rapid development and commercialization of the industry. In this regard, we can certainly borrow the successful experience of air transportation to facilitate the formulation of an appropriate regime for space travel.

### 2.1. Commercial Liability Regime

By referring to the liability issue in outer space, one may immediately think of the Outer Space Treaty and the 1972 Liability Convention. Article VII of the Outer Space Treaty provides that states are internationally liable for any damage caused by their objects or personnel while in space. The Liability Convention, further elaborating Article VII of the Outer Space,

envisions two situations when the launching state(s) is liable: damage caused by its space object on the surface of the earth or to aircraft in flight; damage being caused elsewhere than on the surface of the earth to a space object of one launching state or to persons or property on board such a space object by a space object of another launching state. Strict liability applies to the first situation<sup>17</sup> while negligence liability to the latter<sup>18</sup>. In view of its international nature, this Convention does not apply to two types of people, including the nationals of the launching state.<sup>19</sup> Furthermore, only a state may present a claim for compensation.<sup>20</sup> Accordingly, the Convention fails to specifically outline civilian liability in space.<sup>21</sup>

The ISS IGA, while incorporating the Liability Convention, has further included a provision concerning the mutual exemption of liability on board the ISS for the purpose of better cooperation among the partners. This provision applies to any claims brought by a Partner State for damage, against another Partner State, a related entity of another Partner State, and/or the employees of any of the above entities.<sup>22</sup> Obviously, space passengers cannot rely on this provision for any claims. The public nature of the IGA does not fit well in the present commercial regime. Liability arising out of the disputes in space tourism should be resolved according to the general international law: the space object shall be regarded as extension of jurisdiction of the launching state, whose law prevails.

The existing legal environment, extending only to efforts by states or international non-governmental organizations sending equipment and astronauts into space for the purpose of exploration and scientific research,<sup>23</sup> does not sufficiently address the liability issue in space tourism.<sup>24</sup> Liability to passengers is the main concern in space tourism, which is totally missing in the relevant conventions. In the air transportation, domestic and international transportation are differentiated, which shall not exist in space travel. Nationals of a launching state, as passengers, like that in international air transportation, should be allowed to claim compensation for damages suffered and a uniform regime should be introduced covering all the passengers, goods and related natural and legal persons directly.

In international air transportation, the Warsaw Convention<sup>25</sup> sets a good example in helping to establish a uniform international system, which has further enabled insurance companies to tackle a new field of international transportation

with confidence.<sup>26</sup> A negligence standard, instead of strict liability, was adopted and maximum damage a passenger may claim from an air accident was set at \$ 10,000.<sup>27</sup> The limitation of liability in the Convention is now considered unnecessary in view of the improving reliability of aviation; the 1999 Montreal Convention shows the sign for relaxing the above limitation.<sup>28</sup> Nevertheless, this Convention proves to provide at that period the protection and freedom badly needed by the air transportation industry. The industry was able to flourish and has become the safest means of transportation now.<sup>29</sup> The Warsaw Convention has been under revision afterwards, trying to balance the interests of the industry and other parties (including passengers, third party). The maximum amount has been changed according to social environment. However, the mantra of a negligence standard remains the ground stone.<sup>30</sup>

This story is most convincing to make the proposition that a negligence standard should also be introduced for space travel at least in the beginning in order to get the industry started. The maximum damages payable to passengers should be formulated. Limiting the carrier's liability will not necessarily deter potential space tourists since they can buy additional insurance, as the case in aviation. An appropriate amount shall be determined based on several factors, including the ultimate goal of pushing the development of space travel, the financial situation of the space travel industry, the general background of space passengers. The duration of liability should similarly be the period during which the accident takes place on board the space object or in the course of any of the operations of embarking or disembarking.<sup>31</sup>

A document providing the above propositions is thus indispensable for space tourism. The uncertainty concerning the liability issue can make potential investors afraid that any unknown future regulation may kill the business they are investing in. We may simply modify the Warsaw Convention for space tourism, but of course, we can formulate a new document written along similar lines.<sup>32</sup> By referring to the proposed document, space tourists, governments, commercial operators and insurance companies can all know in advance of possible liabilities and make sensible decisions. The international society will thus benefit from the transparency and legitimacy brought by such an international document.

## 2.2. Space Insurance

Space insurance has been available for a couple of years, especially in the field of satellite launching activities. Further development of space activities has called for more active involvement of private parties. However, a complete set of rules are still to be formulated to realize private financing for space program. In view of the high risks in space activities, the availability of insurance has been a critical element for private parties. Insurance provides relief for a whole range of liability risks currently associated with space activities. This becomes even the truth for space tourism.

Space insurance may be divided into two categories: insurance of space objects and liability insurance. Of course other categories of insurance which are related to space activities also exist, such as product liability insurance. As mentioned above, insurance of space objects have been in existence. Three types of insurance can be further differentiated: pre-launching insurance; launch failure and initial operation insurance; and insurance of the satellite itself.<sup>33</sup> The first satellite insurance contract providing for pre-launching insurance services was concluded in 1965 for Intelsat's "Early Bird".<sup>34</sup> The US Commercial Space Launch Act (CSA) requires entities that launch space vehicles to purchase \$ 500 million in third-party liability insurance.<sup>35</sup> It is thus nothing anew. The legal basis and principle of insurance remain to be largely applicable.

However, the CSA further provides that the US government will cover excess damages up to \$ 1.5 billion and that the launch entities are liable for any damage beyond the \$ 2 billion.<sup>36</sup> Understandably, considering the high risks involved in launching activities, insurance companies are not willing to take possibly high damages. As provided in the CSA, an insurance provider may list specific exclusions to a licensee's liability insurance policy.<sup>37</sup> To a certain extent, the US government acts as an excess insurance carrier, providing a layer on top of the required insurance. On the other hand, insurance policies for commercial launch activities have not been standardized and need to be negotiated on a case-by-case basis.<sup>38</sup> To a certain extent, insurance companies' confidence concerning the scale of risks involved in launching depends much on agreed standards of acceptable risk.<sup>39</sup>

The CSA insurance requirements do not mention space tourists.<sup>40</sup> Insurance for the carrier's liability for the tourists is thus something new to be added to insurance industry with the development of space tourism. The existence of

liability insurance cooperates with the commercial liability regime for space tourism. However, insurance companies might be again unwilling to undertake too much risk. As one scholar has identified, "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."<sup>41</sup> Limits exist for liability arising out of death, personal injury or loss or damage to property; limits can also be set for each and every space flight. Several factors are relevant to the fixed limited, including the length of flight, module and model of space objects; experience of astronauts; air condition during the flight.

On the one hand, it is important to introduce insurance to the space tourism industry. At the present stage, this infant industry requires support from various corners. Insurance industry is indispensable to space carriers, given the high market value of spacecraft and the great financial risks. On the other hand, it is critical to set an appropriate rate so that the insurance industry is willing to enter this potentially profitable market. Again, we can borrow successful experience from aviation. The evolution of space technology has close relationship with the insurance industry. We are fortunate to see that the insurance industry has been mature enough to accept the risks in space industry since 1965.

The development of space tourism introduced new challenging market for insurance industry. This will probably cause a temporary increase in premiums. But in the long run, with the progress of space technology and safety improvement, insurance premiums will be reduced.

### 2.3. Criminal Jurisdiction Regime

Criminal jurisdiction issue has so far been considered as not highly relevant to outer space activities. Currently no international treaty exists for crimes committed on private space vehicles.<sup>42</sup> This situation is understandable when space activities are still largely monopolized by the state. The people on board the space object are normally astronauts trained for special mission. The commander on board the space object has the authority to enforce order and discipline during the whole flight phase.

The ISS Agreement provides the authority of a commander on board the ISS to maintain order. However, it is notable that the ISS Agreement contains a provision on criminal jurisdiction. This is necessary in view of the long-term character of the ISS and the international and

multicultural character of the astronauts on board the ISS. Besides the execution of criminal jurisdiction over its nationals, article 22 further provides the jurisdiction over nationals of another Partner State whose conduct in orbit "(a) affects the life or safety of a national of another Partner State or (b) occurs in or on or causes damage to the flight element of another Partner State". It is thus obvious that the criminal jurisdiction is based on customary principles of nationality and the protective principle. That means, the criminal law of the victim's country will normally apply.

However, the development of space tourism brings new trouble. Space tourists are less prepared and controlled than astronauts, the danger of criminal activities cannot be overestimated. Furthermore, the situation when a non-member country tourist becomes the target of a criminal offence, which is often the case in space tourism, will bring trouble to the above arrangement among the members. Will a non-member country's law be applied here? The ISS IGA arrangement becomes insufficient to deal with the new problems.

In this aspect, we can refer to the similar situation in air transportation. The Tokyo Convention imposes upon the Contracting States a series of obligations that are geared towards stamping out hijacking. According to this Convention, apart from national criminal jurisdiction, each state shall take measures as may be necessary to establish its jurisdiction over the offense and any act of violence against a passenger or crew when (a) the offense is committed on board an aircraft registered in that state....<sup>43</sup> The provision above is claimed to establish the "semi-universal jurisdiction principle". All states have the criminal jurisdiction over any acts causing danger to the aviation industry, which has important impact on the safe operation of the industry and the confidence from the passengers.

Space travel also needs to build confidence from potential passengers, preventing the infant industry from fatal criminal activities. The "semi-universal jurisdiction principle" in the air transportation is also meaningful to space travel. Interested parties should convene to discuss the draft of a similar treaty cracking down criminal acts against space safety.

### 3. Registration and Licensing Regime

As mentioned above, large scale of space tourism largely depends on the development of reusable launch vehicles (RLVs). No doubt,

RLVs are space objects as identified in the Registration Convention. According to this Convention, each party are required to register and maintain a registry of its launched space objects;<sup>44</sup> in addition, the party must provide the UN Secretary-General information proving the establishment of a registry.<sup>45</sup> This requirement is reasonable for purposes like identification of space objects, determining liability. However, when space tourism develops and the launching of RLVs becomes more and more frequent, the requirement of registration appears not feasible and unnecessary. National registry is sufficient for the above purposes. Thus, two types of registration might be suggested: former registration regime continues to exist; however, once space objects like RLVs are used specifically for commercial space travel, only national registry is required.

To guarantee the safety of space travel and enforcement of international obligation of peaceful use of outer space, a state developing space tourism should establish a licensing regime which can provide sufficient supervisory function. An appropriate licensing regime, as the safe valve for security in space travel, is the obligation of the relevant state in guaranteeing the legitimate operation of those licensees.

The USA has established a rather complete legal framework in the licensing regime. The CSA of 1998 laid the regulatory groundwork for RLV licensing. According to the Act, prospective applicants are required to participate in pre-application consultations with the office of the Associate Administrator for Commercial Space Transportation (FAA-AST);<sup>46</sup> following pre-application consultations, applicants must obtain policy approval, safety approval, payload and payload reentry approval, and environmental approval.<sup>47</sup> The requirements have been argued to be too complicated, which will ultimately prevent private companies from getting off the ground.<sup>48</sup>

The 2004 Space Launch Act Amendment,<sup>49</sup> with the aim of regulatory reform and improved interaction with RLV developers, has further ensured its purpose to promote the development of the emerging commercial human space flight industry.<sup>50</sup> It represents the trend of deregulation in the field to avoid "the potential danger of industry-killing over-regulation".<sup>51</sup> For example, time period needed for relevant bodies to take actions has been clearly defined, preventing unduly interference from relevant bodies.<sup>52</sup> Considering the high risks entailed and unwavering emphasis on safety, the complex licensing process is retained. However, it has

been acknowledged that a more streamlined system of requirements is needed to facilitate the licensing process.<sup>53</sup>

The US example clearly shows the vital role of licensing regime in commercial space activities and represents the first significant step towards nurturing and supporting commercial efforts in space tourism. In view of the complicated but indispensable licensing process, the FAA/AST has taken realistic measures to work directly with RLV developers, helping them better understand the process and reflecting their concerns in future space flight policy. This will help to streamline the licensing requirements.

#### 4. The Status of Space Tourists (Space hotel rules)

The emergence of space tourists who go to outer space for leisure set challenge to the existing space legal regime. The astronauts as defined in the 1968 Rescue Agreement outlines procedures for astronaut rescues if the astronauts in an accident, distress, emergency or unintended landing are on the high seas or in any other place not under the jurisdiction of any nation.<sup>54</sup> According to the Agreement, nations are obliged to perform rescue duties for the personnel of a spacecraft in the event of accident, distress or emergency landing.<sup>55</sup> It is to be noted that "personnel of a spacecraft", instead of "astronaut", is not used in the text of the Agreement. Obviously, the term "personnel of a spacecraft" does not necessarily include astronauts.

Literally, tourists are not astronauts or the personnel of a spacecraft. If they are the same as mission specialists, like space engineers or scientists, there will not be much dispute concerning the application of Rescue Agreement.<sup>56</sup> For example, the first space tourist Tito spent six days on board as both a tourist and as an assistant to the crew, helping with a variety of tasks to include the transfer of supplies and scientific experiments.<sup>57</sup>

However, this is only an exceptional case. Space tourists generally do not play a direct role for the benefit and in the interests of all countries. Their main objective is not to contribute to the public interest, but just for their personal pleasure. In no sense do they qualify as "envoys of mankind in outer space"<sup>58</sup>. Accordingly, obstacles exist in applying the Rescue Agreement to space tourists.

Nevertheless, just as identified in the preface, the Rescue Agreement is prompted by sentiments of humanity. This consideration similarly applies to

the rescue of tourists. Thus, ways need to be sorted out to deal with the issue of rescuing tourists in the event of accident, distress or emergency landing. Two ways can be easily identified: formulation of a new agreement with similar provisions of the Rescue Agreement, or extending the existing agreement to the application of space tourists. Considering similar consideration underlying the rescue of astronauts and tourists, we might come to the second option.

In this respect, the 2004 Commercial Space Launch Amendments Act and the ISS IGA offer useful experience. The two documents take different approaches. The 2004 Act clearly defines two different types of people involved in space flight. It provides definitions for the terms "crew" and "space flight participants" and amends existing commercial launch legislation to include these terms alongside the inanimate payloads currently covered.<sup>59</sup> According to this Act, "crew" means "any employee of a licensee or transferee, or of a contractor or subcontractor of a licensee or transferee, who performs activities in the course of that employment directly relating to the launch, reentry, or other operation of or in a launch vehicle or reentry vehicle that carries human being".<sup>60</sup> "Space flight participant" means "an individual, who is not crew, carried within a launch vehicle or reentry vehicle".<sup>61</sup> So it is quite obvious space tourists are considered as space flight participants. This is a direct way to differentiate "crew" from "space tourists". However, this approach has not effectively resolve the issue of protection for space tourists as defined in the Rescue Convention.

The ISS IGA, same as the Rescue Convention, defines the term "crew" as qualified personnel.<sup>62</sup> But this Agreement further provides that it covers the activities of all individuals involved in outer space activities under the heading "Protected Space Operations".<sup>63</sup> This extensive provision validly resolves the above dilemma: the ISS IGA covers all individuals, no matter he/she is piloting a spacecraft, conducting experiments or merely a passenger for fun. By covering anyone whoever is piloting a space object, conducting experiments or merely traveling for fun, this approach is instructive to extend application of the Rescue Agreement to space tourists.<sup>64</sup>

While receiving necessary protections, space tourists, as passengers of a spacecraft, should also comply with rules for good order during the journey. Basically their rights and obligations fall within the competence of the State exercising jurisdiction and control, namely, the

State of registry of the RLV. The commander, providing for the safety and well-being of all persons on board, shall have sole authority throughout the flight; tourists, irrespective of their nationality, are subject to the directions of the commander.

## 5. Conclusion

Space tourism has received great interest from various sides. Some scholars believe that space tourism may be one of the first space industries to emerge and that it will pave the way for everything else.<sup>65</sup> Encouraged by the success of the first two space tourists, space tourism companies, having been set up in recent years, have been actively promoting the program and soliciting support from the governments. As reported, Hong Kong Space Travel Agency has signed a cooperative agreement in early 2005 with American Space Exploration Company; more than 20 Chinese tourists will be sent to the US for training and the first Chinese tourist is to be sent to space in 2006.<sup>66</sup> The reports released so far have sent a clear sign to the public that space tourism has come to a new era.

Drastically different from other means of transportation, such as shipping and aviation, which are governed by a comprehensive framework of national and international commercial law, space activities are supported by inter-governmental treaties negotiated during the cold-war period. While commercial space tourism is coming to reality, the legal regime is still lagging far behind. In view of the many commonalities shared by aviation and space travel, the present paper takes the example of aviation and elaborates on the formulation of a legal regime for space tourism. Actually it is gradually being accepted that the most appropriate regulatory framework for space tourism is to treat it as an extension of aviation.<sup>67</sup> A proper and attractive legal regime will in the end help assure the future of safe and responsible commercial space tourism.

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<sup>1</sup> Kurt Siodmak, *Skyport* (Mass, 1959). See further Space Tourism in Science Fiction, available at <http://www.spacefuture.com/tourism/sciencefiction.shtml> (last visited October 11, 2004).

<sup>2</sup> Jules Verne, a French writer, authored several science fiction stories and the most famous amongst was entitled "De La Terre 'a la Lune" in 1865.

<sup>3</sup> Sputnik I was launched from the Baikonur Cosmodrome in Southern Kazakstan on October 4, 1957. See Craig Covault, Policy and Technology Shape Manned Space Ops, *Aviation Week & Space Technology*, January 8, 2001, at 44.

<sup>4</sup> The First Cosmonaut in the World is in Space, April 1, 1998, available at [http://news.bbc.co.uk/1/hi/special\\_report/1998/03/98/gagarin/72182.stm](http://news.bbc.co.uk/1/hi/special_report/1998/03/98/gagarin/72182.stm) (last visited March 30, 2005).

<sup>5</sup> Anna Badkhen, US Tourist Arrives at Space Station: Tito is Greeted by Russians after Weekend Flight, *Boston Globe*, May 1, 2001, at C4.

<sup>6</sup> First African in Space, available at <http://www.africaninspace.com/home/mission/1/index.shtml> (last visited March 30, 2005).

<sup>7</sup> Decision Paper on Russian Aviation and Space Agency (Rosaviakosmos) Request for MCB Approval of Exemption to Fly Mr. Dennis Tito Aboard the April 2001 Soyuz 2 Taxi Flight to the International Space Station, April 24, 2001, available at <http://ftp.hq.nasa.gov/pub/pao/reports/2001/tito/uscore/decision.pdf> (last visited March 19, 2003).

<sup>8</sup> Peter Baker, U.S., Russia Agree to Allow "Space Tourists", *Washington Post*, August 10, 2001, at A 20; see also African Space Tourist Ends \$ 20 Million Odyssey, May 5, 2002, available at

<http://edition.cnn.com/2002/TECH/space/05/04/sfrica.tourist> (last visited March 30, 2005).

<sup>9</sup> Roscoe M. Moore, Risk Analysis and the Regulation of Reusable Launch Vehicles, 64 *Journal of Air Law & Commerce* 245, 251 (1998).

<sup>10</sup> Statement of Gary R. Bachula, Acting Undersecretary for Technology, US Department of Commerce, US Commercial Space Launch Industry: Hearing before the Subcommittee on Science, Technology and Space of the Senate Committee on Commerce, Science, and Transportation, 105<sup>th</sup> Congress (1998).

<sup>11</sup> STS-107: Columbia Disaster, February 1, 2003, available at <http://www.space.com/columbiatragedy> (last visited March 30, 2005).

<sup>12</sup> First Chinese to have Space Travel, available at

<<http://news.creaders.net/headline/newsPool/30A220050.html>> (last visited November 1, 2004).

<sup>13</sup> Report of the Legal Subcommittee on its 41<sup>st</sup> Session held in Vienna from April 2-12, 2002, United Nations Committee on the Peaceful Uses of Outer Space, UN Doc. A/AC.105/787, at 10 (2002).

<sup>14</sup> I.H.Ph. Diederiks-Verschoor, *An Introduction to Space Law* 5 (2<sup>nd</sup> ed., Kluwer, 1999).

<sup>15</sup> Michael Wollersheim, Considerations towards the Legal Framework of Space Tourism, 2<sup>nd</sup> International Symposium on Space Tourism, Bremen, April 21-23, 1999, available at <[http://www.spacefuture.com/archive/considerations\\_towards\\_the\\_legal\\_framework\\_of\\_space\\_tourism.shtml](http://www.spacefuture.com/archive/considerations_towards_the_legal_framework_of_space_tourism.shtml)> (last visited April 25, 2005).

<sup>16</sup> Recent Development: Commercialization of Space Commercial Space Launch Amendments Act of 2004, 17 *Harvard Journal of Law & Technology* 626 (Spring 2004).

<sup>17</sup> The Liability Convention, Article II provides, "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."

<sup>18</sup> The Liability Convention, Article III provides, "In the event of damage being caused elsewhere than on the surface of the earth to a space object of one launching state or to persons or property on board such a space object by a space object of another launching state, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible."

<sup>19</sup> The Liability Convention, Article VII provides, "The provisions of this Convention shall not apply to damage caused by a space object of a launching state to: (a) nationals of that launching state; (b) foreign nationals during such time as they are participating in the operation of that space object from the time of its launching or at any stage thereafter until its descent, or during such time as they are in the immediate vicinity of a planned launching or recovery area as the result of an invitation by that launching state."

<sup>20</sup> The Liability Convention, Article VIII (1) provides, "A state which suffers damage, or whose natural or juridical persons suffer damage, may present to a launching state a claim for compensation for such damage."

<sup>21</sup> Nandasiri Jasentuliyana, *International Space Law and the United Nations* 390 (1999).

<sup>22</sup> Article 16, para. 3 (a), the 1998 IGA.

<sup>23</sup> Richard Berkley, Space Law Versus Space Utilization: The Inhibition of Private Industry in Outer Space, 15 *Wisconsin International Law Journal* 422 (1997); Joseph A. Bosco,

International Law regarding Outer Space-An Overview, 55 *Journal of Air Law & Commerce* 614-620 (1990)

<sup>24</sup> Ezra J. Reinstein, Owning Outer Space, 20 *Northwestern Journal of International Law & Business* 71 (1999).

<sup>25</sup> Convention for the Unification of Certain Rules Relating to International Carriage by Air, opened for signature October 12, 1929, 49 Stat. 3000, 137 U.N.T.S. 11.

<sup>26</sup> Patrick Collins, The Regulatory Agenda for the Era of Passenger Space Transportation, Proceedings of 20<sup>th</sup> ISTS, Paper No. 96-f-13, available at <[http://www.spacefuture.com/archive/the\\_regulatory\\_reform\\_agenda\\_for\\_the\\_era\\_of\\_passenger\\_space\\_transportation.shtml](http://www.spacefuture.com/archive/the_regulatory_reform_agenda_for_the_era_of_passenger_space_transportation.shtml)> (last visited April 28, 2005).

<sup>27</sup> James E. Dunstan, Is Launching a Rocket Still an Ultra-Hazardous Activity? Toward a Negligence Theory for Launch Activities, 9 *Space Manufacturing the High Frontier: Accession, development & Utilization* 226, 229 (1993).

<sup>28</sup> See for example Montreal Convention, Art. 17. The carrier is always liable to a maximum amount of 100,000 SDR; for damages exceeding this amount, the carrier is liable without limitation unless he proves that the damage was not the result of his negligence or wrongful act (nor of his servants or agents), or such damage was solely due to the negligence or wrongful act of a third party. From this provision, it is obvious that a strict liability applies to the carrier.

<sup>29</sup> Between 1959 and 2002, there were 1,337 accidents worldwide out of a total of 412 million departures. However, approximately 40,000 people died in automobile accidents and 1096 in railway accidents each year. See U.S. department of Transportation, A Comparison of Risk, Accidental Deaths-United States-1994-1998, at

<<http://hazmat.dot.gov/riskcompare.htm>> (last visited November 4, 2004).

<sup>30</sup> The Guatemala Protocol in 1971 provides that the fault liability at present attaching to the carrier will be changed into a risk liability. However few states have ratified this Protocol to date.

<sup>31</sup> See Article 17 of the Warsaw Convention.

<sup>32</sup> Anders Lindskold, Space Tourism and Its Effects on Space Commercialization, Master of Space Studies Program 1998/99, available at <[http://www.spacefuture.com/pr/archive/space\\_tourism\\_and\\_its\\_effects\\_on\\_space\\_commercialization.shtml](http://www.spacefuture.com/pr/archive/space_tourism_and_its_effects_on_space_commercialization.shtml)> (last visited April 29, 2005).

<sup>33</sup> I.H.Ph. Diederiks-Verschoor, *An Introduction to Space Law* 117 (2<sup>nd</sup> Ed., Kluwer, 1999).

<sup>34</sup> *Id.*, at 117.



<sup>35</sup> 49 U.S.C. 70, 112 (2003).

<sup>36</sup> *Id.*

<sup>37</sup> 14 C.F.R. 440.13(a)(5).

<sup>38</sup> Peter D. Nescos, The Challenges Facing the Private Practitioner: Liability and Insurance Issues in Commercial Space Transportation, 4 *Journal of Law & Technology* 25-26 (Winter 1989).

<sup>39</sup> Statement of Patricia A. Mahoney, Chair, Satellite Industry Association, Extension of Space Launch Indemnification: Hearing before the Subcommittee on Space and Aeronautics of the House Committee on Science, 106<sup>th</sup> Cong. (1999).

<sup>40</sup> See generally 49 U.S.C. 70, 112 (2003).

<sup>41</sup> Patrick Collins, The Regulatory Reform Agenda for the Era of Passenger Space Transportation, Proceedings of 20<sup>th</sup> ISTS, Paper No. 96-f-13 (1993), available at <[http://www.spacefuture.com/archive/the\\_regulatory\\_reform\\_agenda\\_for\\_the\\_era\\_of\\_passenger\\_space\\_transportation.shtml](http://www.spacefuture.com/archive/the_regulatory_reform_agenda_for_the_era_of_passenger_space_transportation.shtml)> (last visited April 28, 2005).

<sup>42</sup> R. Thomas Rankin, Space Tourism: Fanny Packs, Ugly T-Shirts, and the Law in Outer Space, 36 *Suffolk University Law Review* 716 (2003).

<sup>43</sup> Tokyo convention, Article 4 (3).

<sup>44</sup> Registration Convention, Article 2.

<sup>45</sup> Registration Convention, Article 2 and 4.

<sup>46</sup> 14 C.F.R. 431.31.

<sup>47</sup> 14 C.F.R. 413.5, 415 (2001).

<sup>48</sup> Charity Trelease Ryabinkin, Let there be Flight: It's Time to Reform the Regulation of Commercial Space Travel, 69 *Journal of Air Law and Commerce* 129 (Winter 2004).

<sup>49</sup> H.R. 3752, 108<sup>th</sup> Cong. (2004).

<sup>50</sup> House Floor Debate on Commercial Space Launch Act of 2004, House of Representatives, November 19, 2004, available at <<http://www.spaceref.com/news/viewstr.html?pid=14565>> (last visited December 1, 2004).

<sup>51</sup> H.R. 3752, 108<sup>th</sup> Congress, 2<sup>nd</sup> Session, Report No. 108-429, available at <<http://www.theorator.com/bills108/hr3752.html>> (last visited December 1, 2004).

<sup>52</sup> For example, Art. 3(c)(7) provides that the Secretary of Transportation shall issue the experimental permit required by human space vehicle operators no later than ninety days after receipt of an application and that the Secretary of Transportation would be obliged to inform the applicant of any issues arising during the review of an application and actions to be taken to resolve them, within the first sixty days after the receipt of the application.

<sup>53</sup> Ryabinlin, *Supra* note, at 137.

<sup>54</sup> Rescue Agreement, Art. 1-4.

<sup>55</sup> Rescue Agreement, Art. 1. David Tan, Towards a New Regime for the Protection of Outer Space as the "Province of All Mankind", 25 *Yale Journal of International Law* 158 (2000); Ty S. Twibell, Space Law: Legal Constraints on Commercialization and Development of Outer Space, 65 *UMKC Law Review* 595 (1997).

<sup>56</sup> Yasuaki Hashimoto, The Space Plane and International Space Law, available at <[http://www.spacefuture.com/pr/archive/the\\_space\\_plane\\_and\\_international...](http://www.spacefuture.com/pr/archive/the_space_plane_and_international...)> (last visited October 11, 2004).

<sup>57</sup> Jim Banke, Space Tourist Pays His Full Fare, available at <<http://www.msnbc.com/news/509288.asp>> (last visited January 2, 2001).

<sup>58</sup> Outer Space Treaty, Art. 5.

<sup>59</sup> Recent Development, *supra* note, 627.

<sup>60</sup> H.R. 3752, 108<sup>th</sup> Congress (2004), Art. 3 (b) (2).

<sup>61</sup> H.R. 3752, 108<sup>th</sup> Congress (2004), Art. 3 (b) (9).

<sup>62</sup> ISS IGA, Art. 11 (1).

<sup>63</sup> ISS IGA, Art. 16 (2)(f).

<sup>64</sup> Lara L. Manzione, Multinational Investment in the Space Station: An Outer Space Model for International Cooperation?, 18 *American University International Law Review* 521 (2002).

<sup>65</sup> Albert A. Harrison, *Spacefaring: The Human Dimension* 12 (2001).

<sup>66</sup> The First Chinese Tourist Expected to Explore in Space Next Year, February 28, 2005, available at

<[http://tour.huash.com/gb/tour/2005-02/28/content\\_1668183.htm](http://tour.huash.com/gb/tour/2005-02/28/content_1668183.htm)> (last visited March 8, 2005).

<sup>67</sup> Patrick Collins & Koichi Yonemoto, Legal and Regulatory Issues for Passenger Space Travel, *Proceedings 49<sup>th</sup> Colloquium on the Law of Outer Space*, available at <[http://www.spacefuture.com/pr/archive/legal\\_and\\_regulatory\\_issues\\_for\\_passenger\\_space\\_travel.shtml](http://www.spacefuture.com/pr/archive/legal_and_regulatory_issues_for_passenger_space_travel.shtml)> (last visited October 11, 2004).